THE IRON AGE — November 8, 1934

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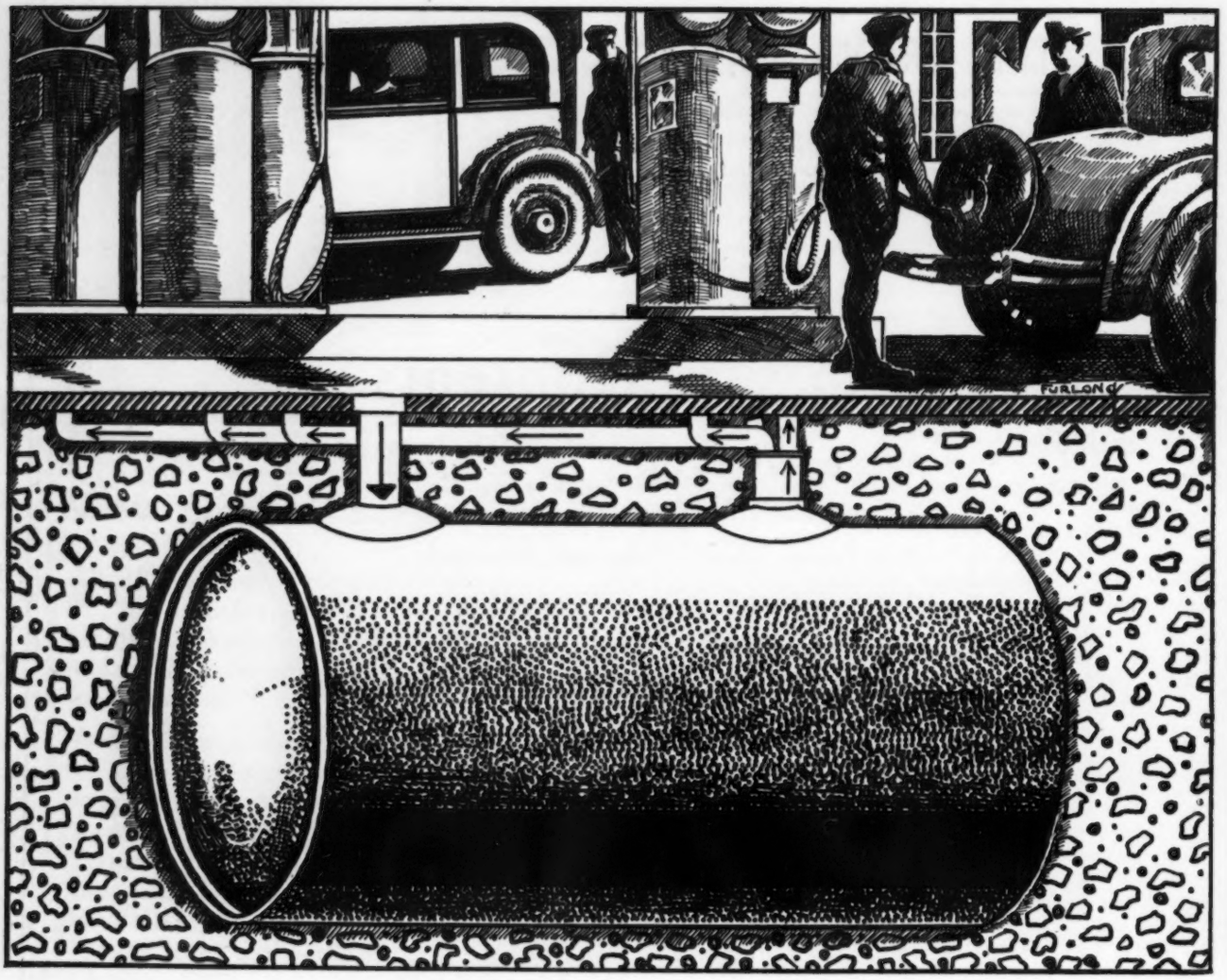

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Firing on the White Flag of Truce

IDEALISM is not undesirable, but it is sometimes impractical. The average run of human nature cannot live up to it. That is why so many of the current "reform" proposals have been unsuccessful. You cannot legislate a state of sanctity unless you abolish the devil.

A pertinent example is found in the President's proposed labor relations truce.

In an endeavor to put an end to the deplorable epidemic of strikes which had blocked recovery, the President proposed a truce under which each side would maintain the "status quo" for six months. It was a gesture which appealed to employers and workers alike.

The philosophy back of it was sound. If you can get two nations which are at war to declare a truce, the probabilities are that they will not resume hostilities after the truce is over. Both sides will find peace more profitable. If we could have freedom from strikes and strike threats for six months, capital and labor would find it equally profitable. Investment funds would come out of hiding, business volume would increase, employment would pick up and thin pay envelopes would become fatter.

But the labor truce was too good to be true. It was an ideal to which the average run of labor leadership could not measure up. Hence we find union chiefs putting strikes to the fore again.

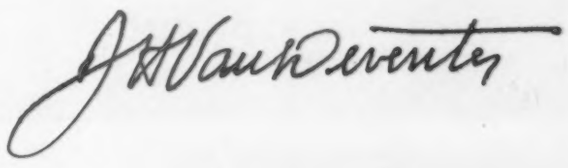
No political administration has given union labor as much consideration and help as has the present one. No administration has done as much to aid union labor in extricating itself from embarrassing strike situations in order to "save face" with the public. Yet when the President of the United States urges a labor truce for six months, union labor fires on the white flag in less than six weeks.

Everyone benefits from peace and suffers from war except the mercenaries. They wax fat on strife. That is why it is proposed to take the profit out of war.

We suggest that the administration, having found that its ideal of a labor peace cannot be attained by present methods, turn its attention to banishing the devil which prevents it. That devil is the selfish interest which many so called "labor leaders" have in fomenting strife.

Take the profit out of labor war. It can be done by the incorporation of labor unions; by public auditing of their accounts and by the disclosure of salaries and other perquisites paid to union officials.

Such a proposal would be welcomed by the rank and file of union dues payers for it will show them, for the first time, where their money is going and what they are getting for it. And it will be particularly welcome to the public and to unorganized independent labor who are the chief and the innocent victims of labor wars.



Interchangeable

Determines Truck

A PRODUCTION line for the manufacture of truck and motor coach engines which is of outstanding interest because of the use of special equipment of unusual flexibility recently has been installed in the plant of the White Motor Co., Cleveland. A single type of engine is produced.

General-purpose equipment, rather than highly specialized or single-purpose machine tools, ordinarily would be used in the engine machining line in a plant making trucks or buses because of the limited output as compared with the mass production in a plant making passenger motor cars. However, the flexibility of what may be classed as special-purpose equipment has been materially increased by the provision of machines for milling, boring, drilling and tapping operations with interchangeable heads carrying quickly detachable work units and with changes in fixtures for different operations. This flexibility permits the return of the engine block to a machine for additional operations after certain intermediate operations, as well as for performing duplicate operations on both banks of cylinders. As many as three separate operations with different tooling are performed on the same machine to which the block is returned after intermediate operations.

The production line is used in the manufacture of a new 12-cylinder horizontally opposed pancake-type engine that represents quite an evolution in the design of a gasoline engine. Machining operations in the manufacture of the original White pancake-type engine were described in THE IRON AGE of Aug. 3, 1933. This type, which is still being produced, is a 12-cylinder horizontally opposed engine with two separate blocks and separate crankcase.

The two cylinder banks and crankcase of the new engine are made of a single casting. This is made possible by the use of centrifugally cast wet sleeves or cylinder liners which may be replaced when the bore is worn, thus eliminating the necessity of regrinding the cylinder bores.

This type of engine block is intricate in design and the standards set by the White company for quality of product demand precision work necessitating the use of tools that will assure extreme accuracy. The machinery layout involved the expenditure of $125,000 in new tools and fixtures and in retooling some of the general purpose machines.

The machinery line is laid out so far as possible for straight-line production, although the cycle of operations necessitates the back-tracking of the block to some of the machines for later operations. The production line is served by roller conveyors 30 in. above the floor and includes conveyors for the return of blocks to machines on which more than one operation is performed. The conveyor is provided with turntables and roll-

View of a portion of the production line for machining White 12-cylinder pancake engines and conveyor lines back of the machines.

Equipment

Production Routing

By F. L. PRENTISS
Cleveland Editor, The Iron Age

over fixtures for delivering the large block to the machine in any position required for the operation. In addition, there is a section of roller conveyor just above the floor level which is a more convenient height for serving a few of the machines.

Five special but flexible machines comprise the more conspicuous equipment in the production line. These and some of the more standard equipment were built by the Ingersoll Milling Machine Co., which supplied special tools and fixtures for other machines.

The first operation consists of rough and finish milling various faces on the engine block. This is done on a fixed rail type of machine with two fixtures. At the front is a specially designed head carrying two vertical cutters and adjoining this is another head carrying a third cutter. In the rear is a 16-in. combination vertical cutter. In addition, there is a horizontal cutter on either side at both the front and rear. The rough cuts are taken at the front of the machine and the finish cutters are at the back. The vertical cutters rough and finish mill the top of the oil reservoir faces, intake manifold faces and main bearing cap dowels. The horizontal cutters mill both sides of the cylinder head contact faces.

On the duplicate milling machine the front and rear end of the crankcase is rough and finish bored. One-eighth inch of metal is removed in the rough and finish milling, the finish cut being 0.025 in., which is held within 0.002-in. limits

Between the two milling machine operations dowel holes are drilled and reamed in the top of the face on radial drills, and these serve as locating points for every succeeding operation.

The valve cover faces, exhaust manifold sides and various other faces and pads on both sides of the block are milled on two plain milling machines. Then the block is placed on the conveyor for succeeding operations.

Facing the main bearings to length, the next operation, is performed on a standard Rockford horizontal boring machine equipped with special tools.

Then come the first operations on one of the special machines, which is a two-way drilling and boring machine, one head with six and the other with 12 spindles. The block is turned upside down in a turntable in the conveyor line and pushed on the fixture located in the base at the side of which are the two heads individually supported. Rollers in the fixture facilitate moving the block in and out of the machine. The 12 drills on the right side as shown in the photograph with the head set at a slight angle, which may be changed by spacers, rough bore the exhaust valve throats and spot drill the valve guide and port-holes. At the same time the six tools on the left side rough bore and counterbore the wet sleeve seats on the opposite side. Then the block is

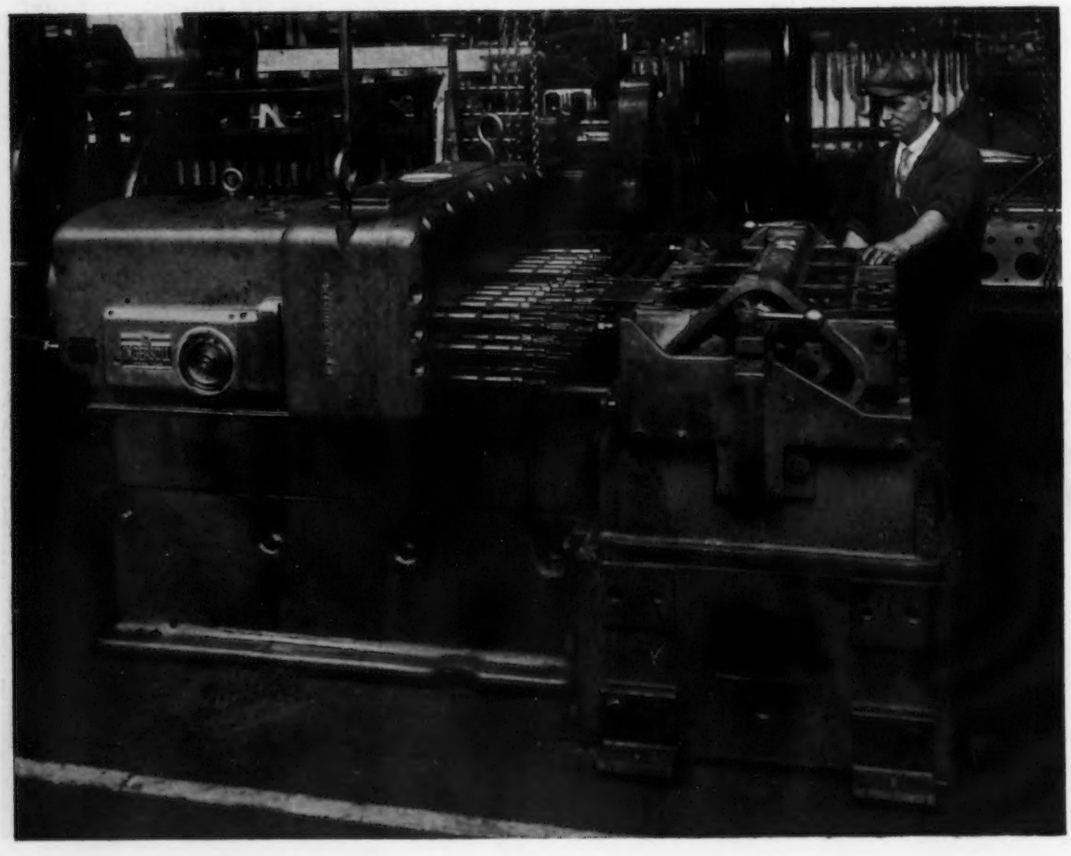
Exhaust valve throats are rough bored and valve guide and port holes are drilled on the right side and simultaneously wet sleeves are bored and counterbored on the opposite side of this two-way machine to which the block returns twice for successive operations.

Four long longitudinal oil lead holes are drilled through the block in two operations and other holes are drilled on this 11-spindle one-way drilling machine.

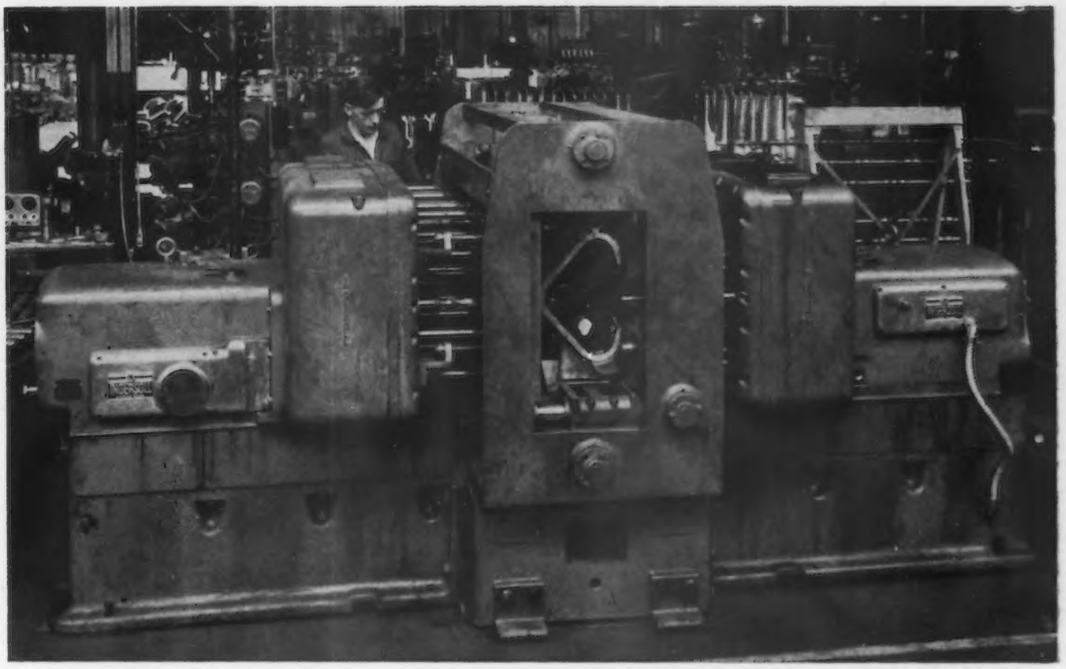
turned end for end and the operations are repeated. The block makes two other trips to this machine, one for finishing operations and the second to bore these cylinder sleeve grooves for rubber rings that provide the water seal for the wet sleeves. The spindle heads are changed for these operations.

The next machine is an 11-spindle, one-way drilling machine that uses seven spindles. The operations include drilling four longitudinal oil lead holes from the front half way through, drilling a ¾-in. hole and drilling and counter-sinking two dowel holes in the flange for locating the gear cover. Later the block returns to this machine with a change to a six-spindle head, and the four oil lead holes are drilled from the other end to meet those drilled during the first operation and two water drain holes are drilled.

Then the cylinder head stud holes are drilled and countersunk and water circulation holes in the cylinder head contact faces are drilled on the sides of the block in a 59-spindle, one-way drilling and tapping machine. This has two interchangeable heads, one for drilling and the other with 42 spindles for tapping, which is done later in the cycle of operations. Two settings are required for each operation.



Cylinder head stud holes are drilled on the sides of the block and water circulation holes in the cylinder head contact faces are drilled and tapped on this 59-spindle machine, which has two interchangeable heads.



204 holes of various sizes are drilled simultaneously in the cylinder block on this two-way drilling machine.

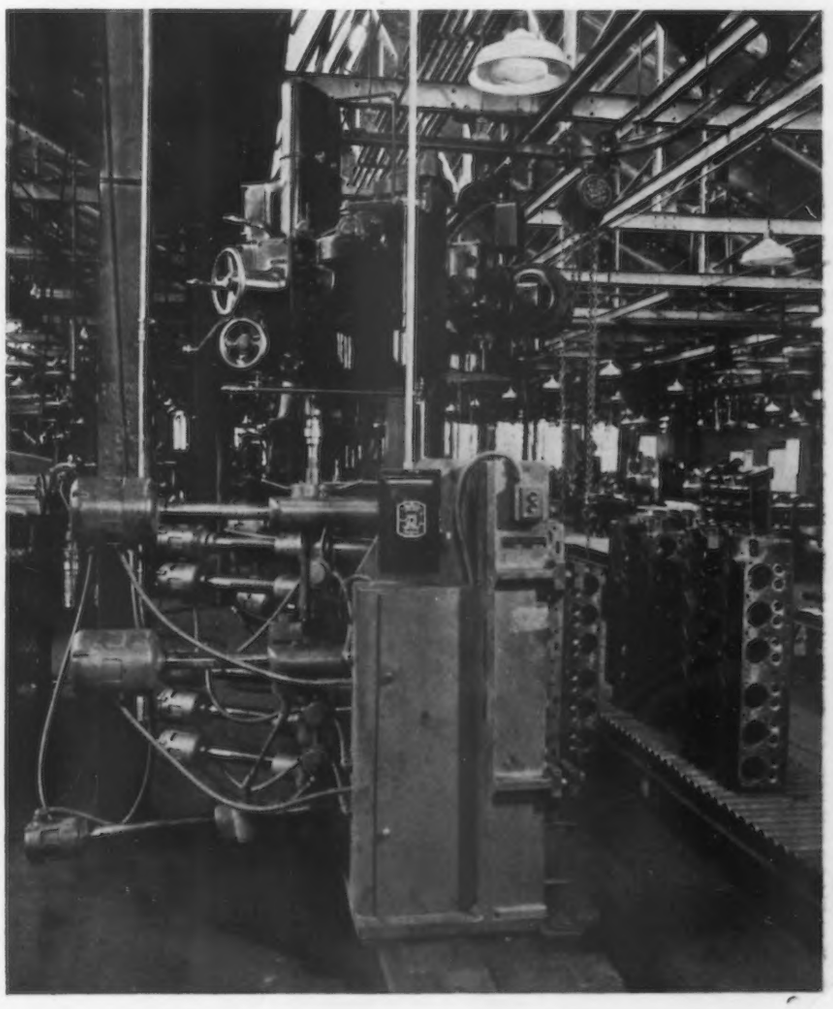
Various sized holes, 204 in number, in the top and bottom of the block for the cylinder studs are drilled simultaneously and countersunk in a two-way drilling machine. Opposite this machine is a cradle in the conveyor line for turning the block on edge, and it slides into the fixture over rollers in the bottom of the fixture.

Exhaust insert seats are then counterbored and the valve guide stem bushing holes are finish-reamed on a six-spindle boring machine with a special rotary fixture. After one side is counterbored the block is turned over and the holes in the other side are reamed.

After several boring, counterboring and tapping operations on standard radial drills for holes that cannot be reached with the special machines, the block is delivered by an end for end turnover device to two Natco multiple spindle drills equipped with special features. One of these drills 22 gear and stud holes and the other 18 holes in the clutch end.

The next operations are performed on a very unusual piece of equipment built around a radial drill and set up for a combination of operations. On one side of the column is a fixture in which the block is mounted vertically for milling with a milling attachment operated by the drill head, a clearance between the intake and exhaust valves. Then the block is moved to the other side of this base where there is a fixture with 10 individually driven heads for drilling simultaneously long and small angular oil lead holes from the main bear-

This is a very unusual machine built around a standard radial drill. In the rear a milling operation is performed with a milling attachment attached to the drill head. On the opposite side or front as appears in the picture there are ten individually driven heads that drill simultaneously and at various angles long and small bore oil lead holes from the main bearing.



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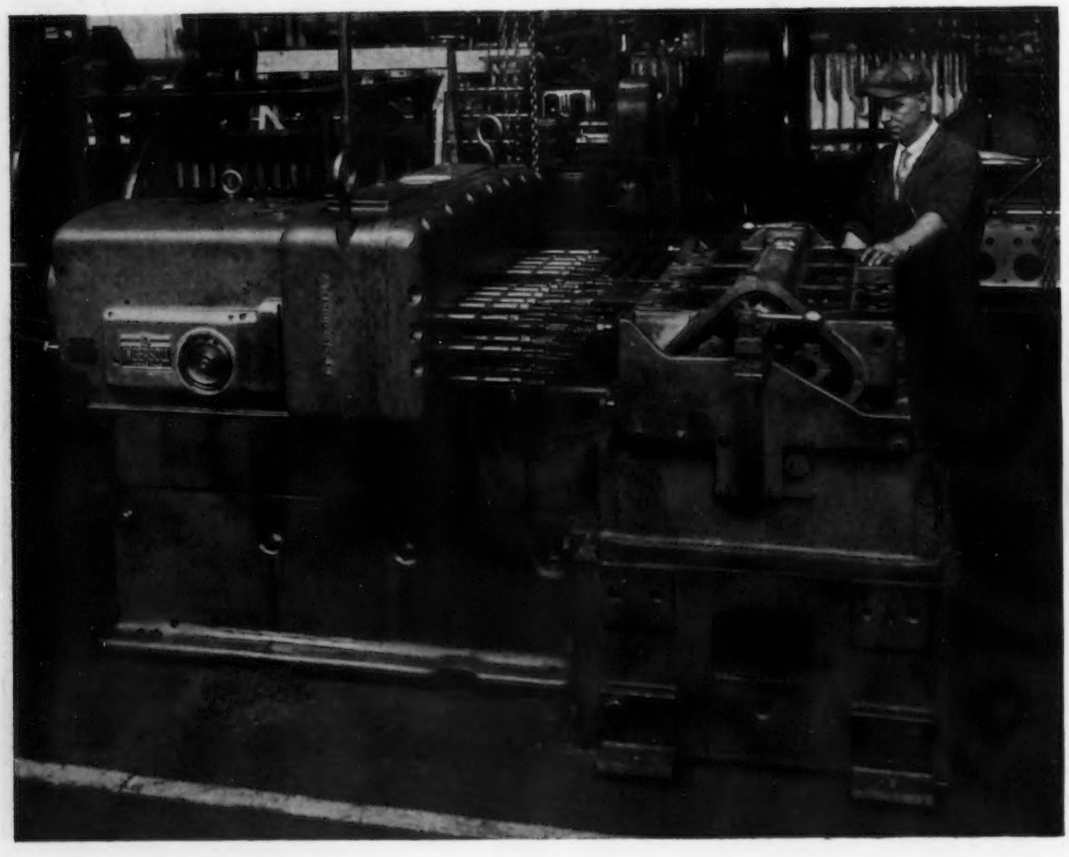

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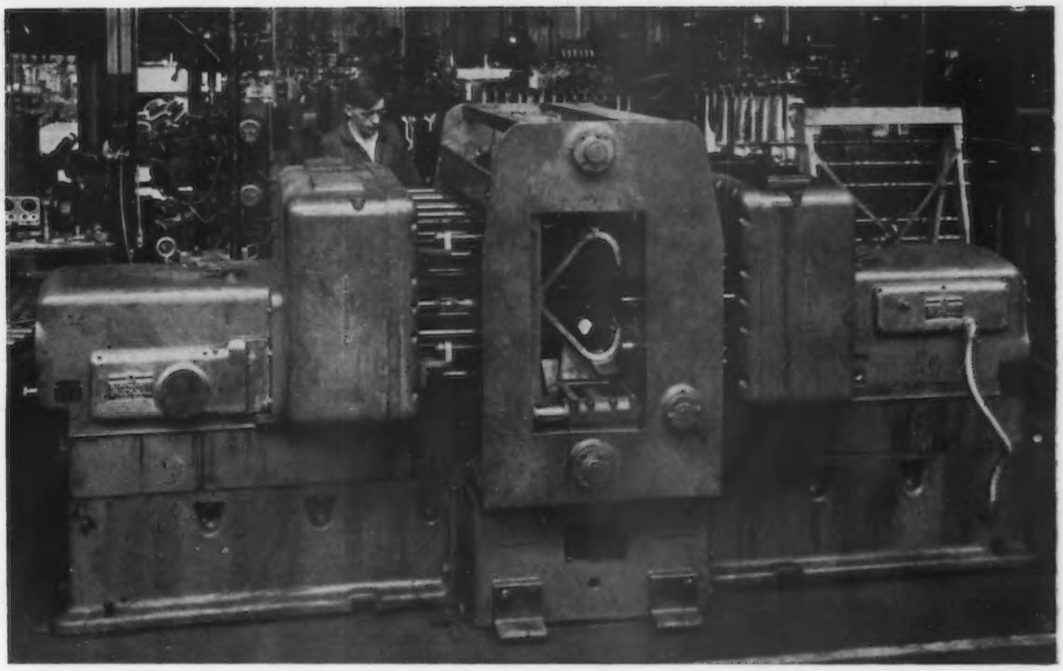

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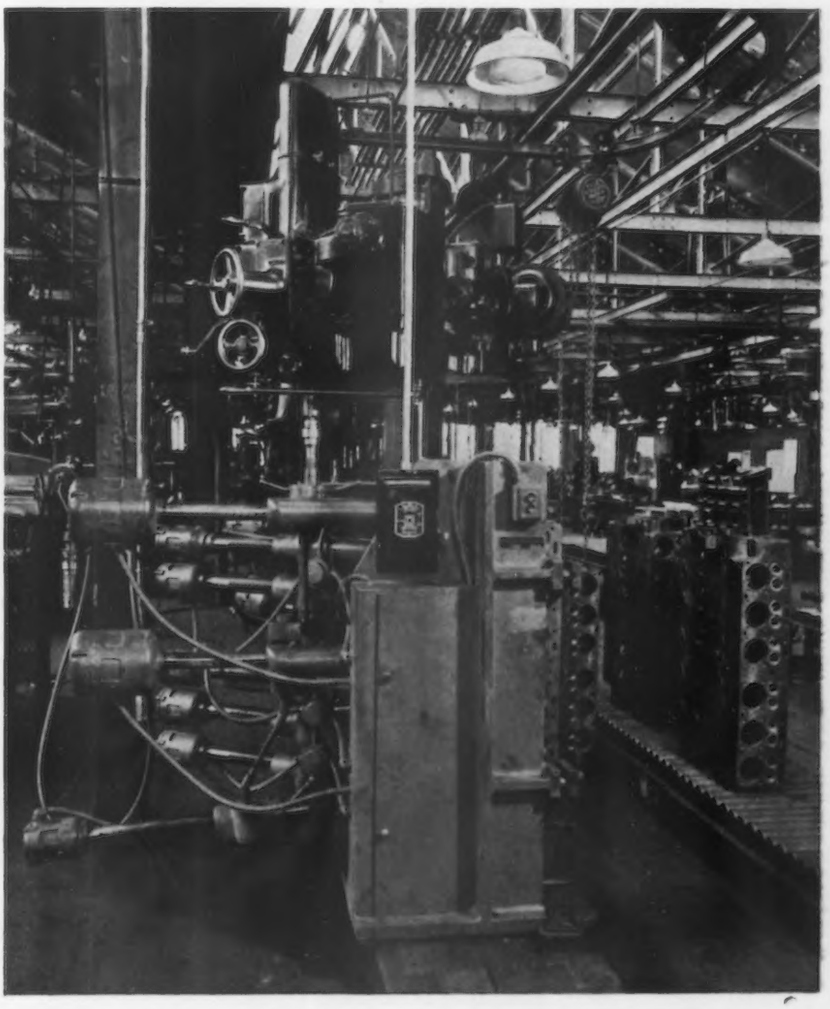
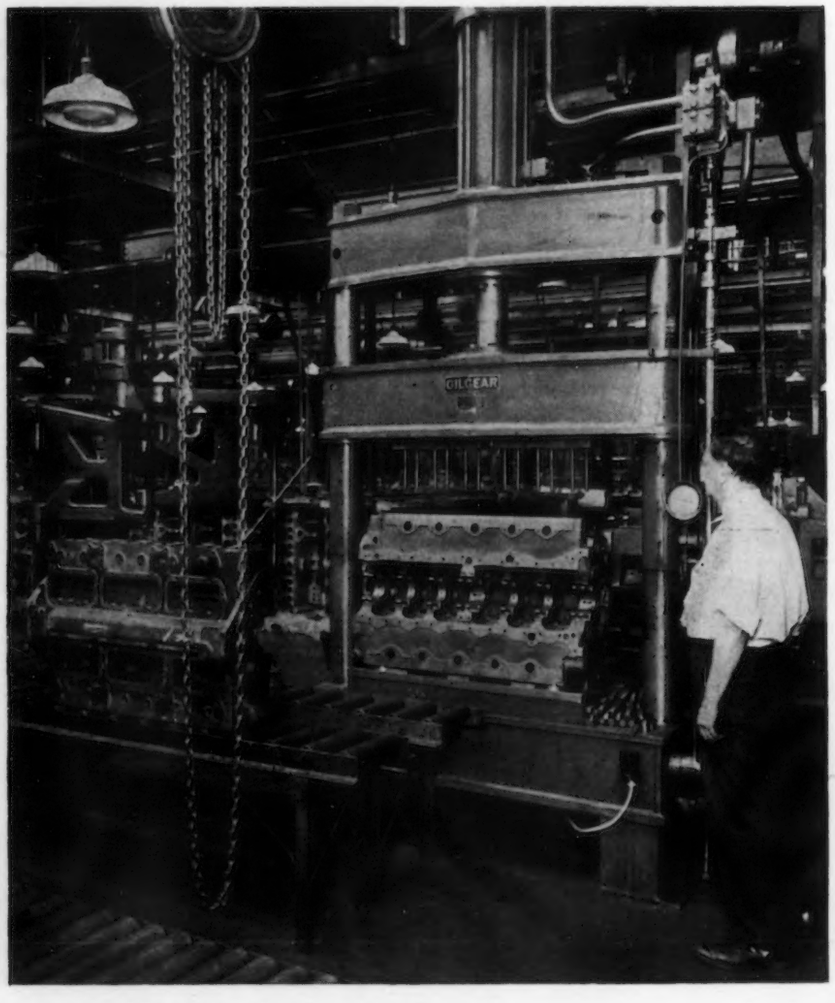


This unusual two-way 12-spindle machine, designed to work at close quarters, rough bores valve tappet holes on one side and on the opposite side spot faces valve lifter holes and spot faces the spring seats.

This triple duty machine broaches the 12 valve lifter guide holes and presses in the valve stem guides and broaches the valve stem guide holes.

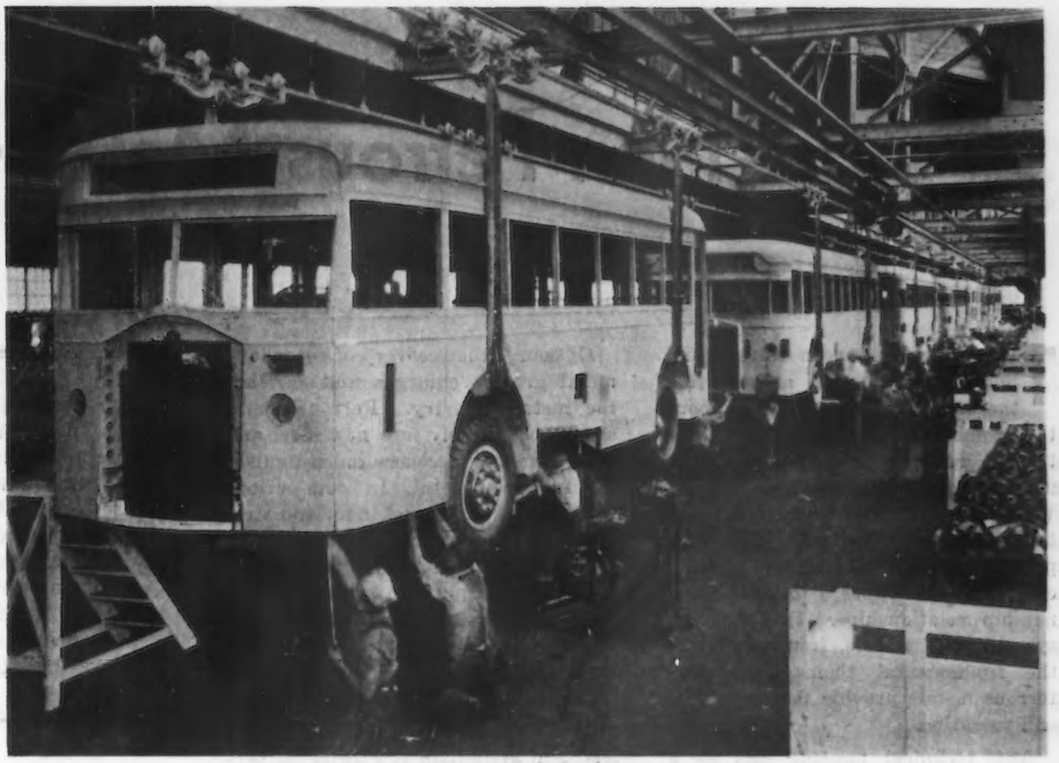


ings. A unique feature of this machine is that the feed mechanism for the individual drilling heads is driven by the radial drill.

A three-spindle Rockford boring machine with a special fixture is used for boring and reaming the main bearing holes and the camshaft bores and idler bore. This machine performs roughing, semi-finishing and finishing operations.

There are still a number of drilling, boring and tapping operations which are done on a standard radial drill equipped with a turnover fixture. There are also some additional angular oil holes to be made which are drilled on a radial machine while the block is held in a turnover fixture.

The machine on which the next operations are performed is of particular interest because it had to be designed to perform operations in very close quarters. This is a two-way, 12-spindle machine with the tools on either side working at a slight angle. The group on one side rough bore the valve tappet holes. While this is being done one of two sets on the opposite side spot faces the valve lifter holes to close tolerance. The head on the spot facing side then automatically reverses and spot faces the spring seats. Then the block is shifted to the next six holes, and when the cycle of operations is completed the block is turned end for end and the operations are repeated. From 0.002 in. to 0.004 in. of stock is left on the valve tappet holes for broaching.



An assembly line for motor coaches is a recent innovation. The coach body is suspended on a conveyor and the motor and other parts are assembled to the body at various stations along the conveyor line.

After the block is loaded in the fixture the latter is raised by the turn of a wheel at the front of the machine, its proper height being fixed by locating points.

Three operations are performed consecutively on a 12-spindle Oilgear hydraulic broaching machine. These include broaching the valve lifter guide holes to size, pressing in the valve stem guides and broaching the valve stem guide holes. When one side is finished the block is turned over and the operations are repeated on the opposite side. The valve lifter holes are broached with a tolerance 0.0007 in. Next the cam bushings are pressed in and peened on an Oilgear press equipped with a special bar with which seven bushings are pressed in and peened simultaneously.

Then the main bearings are assembled to the crankcase on the conveyor, after which the main and cam bearings are diamond bored on a machine designed by the White company, diamond boring of these bearings being standard practice with this company.

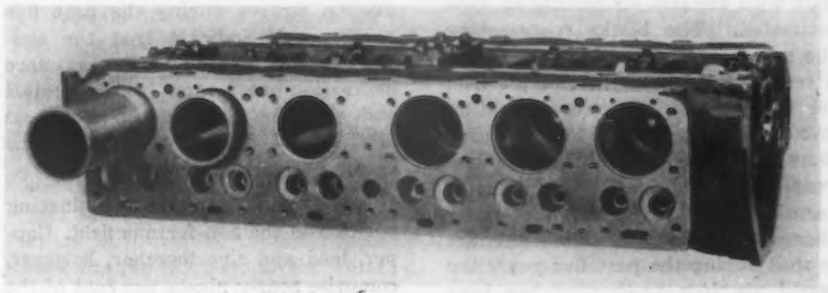
The exhaust valve seats are then assembled and ground in place one at a time with special equipment. Then the wet sleeves are assembled and studs are driven on the heads and ends, after which the block is given the water test and then goes to the main assembly line.

A conveyor line for assembling motor buses is a recent innovation in the White plant, the present method replacing the common practice of setting the body on posts, where it remains stationary until all the parts are assembled.

The body frames are hung on an overhead conveyor consisting of two tramrail tracks spaced at proper distance and equipped with trolleys from which are suspended arms carrying brackets at their lower end. The body is supported by four of these trolleys on the four brackets which are hooked under the wheel housings.

The frame is hung on the conveyor at the front of the line and the engine and other units are assembled underneath, the body being pushed along the conveyor for successive operations. Moving the engine and other heavier parts along to the point of assembly is facilitated by the use of hand hoists. Storage racks for parts are located along the side of the assembly bay, each part being stored near the point at which it will be used. The conveyor is approximately 280 ft. long and has a capacity for handling seven bodies at a time. Considerable saving in handling parts is effected, for with the body moving along an assembly the distance the parts have to be moved to the body is shortened.

The body, after the working units are affixed, is sent back to the body builder, the Bender Body Co., Cleveland, and the bodies are finished with the upholstering, windows and other body equipment. Then the bodies are painted and the finished bus is returned to the White plant for final checking.



This view shows the engine block wet sleeves the seats of which are six-tool bored and counter-bored as described.

Non-Ferrous Metals—Past

AS we look for the reasons for the great variety and diversity of the metal industry, they are not difficult to find. Each metal has gained its commercial status because it meets certain requirements more economically than any other material, or because its use provides some special satisfaction to human beings. In this review Dr. Jeffries presents the current

THE division between ferrous and non-ferrous metals arises from the astounding fact that of about thirty metallic elements used industrially, iron accounts for more than 90 per cent of the total production. While this may justify the classification of metals in two main groups, it provides no excuse for stressing their competitive as opposed to their partnership relationships. In the great symphony of metals, iron constitutes the fundamental theme, and non-ferrous metals provide the harmonies and variations.

Any technical meeting has as a principal objective the consideration of metals; not merely as competitors with one another and with other materials, but as true partners working together toward a higher standard of existence. In the first Robert Henry Thurston Lecture presented before the American Society of Mechanical Engineers in 1925, there was reported a statistical study of metals showing the relative production of new non-ferrous metals and of pig iron for the forty-year period which ended with 1924. For the whole forty-year period the ratio of pig iron to non-ferrous metal production remained at about twenty to one.

In 1930, in the Henry Marion Howe Memorial Lecture, this chart was extended to include the five years from 1925 to 1929 inclusive. There was a slight increasing trend in non-ferrous metal production from 1915 to 1925 which became more pronounced during this five-year period.

The chart in Fig. 1 is brought up to date with the last six months of 1934 estimated. The blocks representing the non-ferrous metals are drawn on a scale twenty times that of pig iron for the purpose of better indicating trend changes. With statistics for more than four and a half of the five-year period available, the final corrected figures will not materially change this chart. A significant fact is that during the past five years the world pig iron production has been not twenty but fourteen times that of new non-ferrous metals.

Of course the recovery of secondary metal greatly enlarges and enriches the metal industry. Ferrous metal scrap goes largely into new steel and cast iron and becomes indistinguishable from new metal. In boom periods the production of steel ingot and steel castings is only moderately greater than that of pig iron. During the last few years the pig iron production has been only about two-thirds that of steel. It is well known that in periods of low production the percentage of scrap in steel is increased.

The recovery of secondary copper, lead and aluminum is greater in percentage of new metal produced than iron scrap and that of zinc and nickel is less. The recovery of tin seems to be about comparable in percentage with that of iron scrap. On the whole there is a greater relative recovery of non-ferrous metals. The trends suggested by the information given in Fig. 1 would not be greatly affected, however, if all scrap and secondary metals were included. The production of manganese and chromium is not included in the non-ferrous metal tonnage.

Lead is Depression Proof

It would appear that during the first thirty of the past fifty years the production of pig iron followed one trend line and during the last twenty years another. The rate of increase has been markedly less during the past twenty years. On the other hand there is nothing to indicate any marked change in the non-ferrous metal production trend during the past fifty years. A study of the production figures during the past five years would indicate that the non-ferrous metals as a whole are more depression-proof than iron and steel and, with the exception of gold, lead is the most depression-proof of the major non-ferrous metals.

No one metal occupies a dominating position in the non-ferrous field. Copper, lead and zinc together, however, comprise nearly ninety per cent of the tonnage.

If, instead of comparing the weights, the charts were prepared on a volume basis, there would be a small advantage in favor of pig iron. If, however, the comparison is made on the basis of value, the non-ferrous metals have such an advantage that a different scale must be used. In 1929 the value of the world pig iron production was close to two billion dollars and that of the world gold production about four hundred million dollars. In 1934, it is estimated that the value of the gold production at new prices will be about nine hundred million dollars, and the value of the pig iron production should be nearly the same.

A few years ago the world production of copper had a higher value than that of gold. No non-ferrous metal is even a close second to gold at present. The total value of the new non-ferrous production is at present substantially greater than that of pig iron.

Industrial non-ferrous metals may be divided into two general classes: (1) those used in substantial quantities in the pure state or serving as the base metal for alloys; and (2) those used primarily as alloying constituents. The first group comprises aluminum, copper, gold, lead, magnesium, mercury, nickel, palladium, platinum, silver, tantalum, tin, tungsten and zinc. The second group includes antimony, arsenic, beryllium, bismuth, cadmium, cerium, chromium, cobalt, iridium, manganese, osmium, rhodium, titanium, vanadium and zirconium.

and Future

By ZAY JEFFRIES
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uses of the non-ferrous metals as well as the individual qualities which fit each for a specific purpose. What may be expected in the future from the common and less common metals is also examined. This manuscript was presented on Oct. 2 in New York before the metropolitan section of the A.S.M.E. and visitors to the National Metal Exposition.

The elements carbon, silicon, phosphorus and sulfur are also used for alloying purposes. Both cadmium and chromium find industrial use in the substantially pure state in the form of electro-plated coatings on other metals.

Antimony is used as an alloying element in bearing metals and also in type metal. It is used for type metal alloy because of its potency in reducing the crystallization shrinkage of lead, and in the solid state it occupies approximately the same volume as in the liquid state.

Beryllium is now used as an alloying element with copper. The tensile strength of annealed copper is about 33,000 lb. per sq. in. By adding 1.5 to 2.5 per cent beryllium and by heat treatment, the tensile strength can be raised to 200,000 lb. per sq. in. The beryllium-copper alloys have remarkable combinations of properties including high strength and hardness with good corrosion and fatigue resistance.

Bismuth is used in various low melting alloys including certain solders. Cadmium is used in low melting alloys and in addition finds some use in silver alloys. Alloyed with copper, it is used in the production of welding electrodes. Chromium is used chiefly as an alloying element in ferrous metals. It is the foundation for the so-called stainless steel alloys, whether they contain nickel or not. It is also used as an alloying ingredient in heat resisting castings, and in high speed and other steels. Nichrome, the well-known electric heating element material, is an alloy containing around 20 per cent chromium.

Cobalt is used as an alloying element in cutting tools and wear resisting metals such as Stellite. It is used as an alloying element in high speed steel and is the main cementing material for the hard cemented carbides. It is also used in magnet steels. Iridium and osmium are used to alloy with platinum to which they impart hardness and strength. Rhodium is used for the same purpose but in addition it is used as plating material for other metals. While the principal use of manganese in the metallic form is in the production of steel and as an alloying element in steel, it is also used to a minor extent in non-ferrous alloys.

Titanium and vanadium are used chiefly in connection with the manufacture of steel but both are used to a minor extent as alloying ingredients in non-ferrous metals.

Cerium is used to alloy with iron and other metals because of its pyrophoric characteristics. It is the metal which is responsible for the sparks used in cigaret lighters and similar devices.

Carbon and silicon are important alloying elements but they are classed as metalloids rather than as metals. They have some properties like metals and other properties like non-metallic substances. They are both used in large quantities as alloying elements in pig iron and steel, and silicon is an important alloying element in certain non-ferrous alloys, particularly those of aluminum and copper.

Phosphorus is also used as an alloying element in cast iron, steel and certain non-ferrous alloys, particularly with copper.

Among the metals which are used industrially in the more or less pure state, or as the main base for alloys, gold occupies a unique place. In addition to providing the main metallic base for the currency of the world, it has a wide variety of industrial uses. The greatest industrial outlet for gold is in jewelry and in dentistry. In addition to providing a secondary metallic base for the world currency, silver is an important industrial metal. Its use in photography, in tableware and in jewelry would alone give it a high rating. It has, however, a variety of other outlets as a plating metal, for special solders, as an alloying element, and in the electrical industry.

Mercury also occupies a unique place because it is the only commercial metal reasonably stable in the atmosphere and which is liquid below room temperature. It finds wide industrial use in thermometers, electric switches, lamps and gages of various kinds, because of its liquidity, its electrical conductivity, its high density, and the properties of its vapor. It is now being utilized in connection with mercury turbines for the generation of electrical energy. It provides the foundation for the mercury vapor vacuum pump. It is used as an alloying element particularly in connection with the so-called "amalgam" dental fillings. Its ability to alloy with gold and silver makes it useful in the recovery of these metals from their ores.

Platinum and palladium and their alloys are used not only in the jewelry trade but also for some very important industrial applications. They are particularly valuable in the chemical and electrical industries where they are used for electrical contacts, for temperature control, and in the construction of special apparatus. The platinum-rhodium combination is still in great demand for high temperature thermocouples, and there is no real substitute for platinum in the chemical laboratory.

Substantially pure wrought tantalum is a commercial product used for a variety of purposes throughout the world. It is produced in the form of wire and sheet. It has unusual resistance to certain chemicals and as a consequence finds commercial adaptation in the chemical industry. It is useful, too, in the laboratory. It is used in the form of a cemented carbide either alone or mixed with other

carbides in the manufacture of hard tool and die materials.

Tungsten Uses Are Increasing

Tungsten has the highest melting point and the lowest vapor pressure of any of the elemental metals. Among all the elements, its vapor pressure is second to none and its melting point is second only to that of carbon. In the substantially pure form it has many uses including incandescent lamp filaments, vacuum tube filaments and other parts, contact surfaces for ignition systems, phonograph needles, laboratory equipment and resistors for high temperature electric furnaces. It is the principal alloying element in high speed steel and one of the principal ones in Stellite. It is used also in other steel alloys. It is the principal material used in the hard cemented carbides and in heavy duty resistance welding electrodes.

Molybdenum is used in the substantially pure state in the form of wire and sheet in the incandescent lamp industry and in the vacuum tube industry as well as a resistor for high temperature electric furnaces.

Of the three major non-ferrous metals, from the standpoint of tonnage, copper is perhaps the most versatile. Electrical manufacturers consume about 25 per cent of the copper production and the communication and power transmission industries another 25 per cent. The automobile industry consumes about 10 per cent and the building industry between 5 and 10 per cent. The other uses are so diversified that it may be said that it is used to a greater or lesser extent in every major industry.

The use of lead is also greatly diversified. Its greatest use during the past 10 years has been in the manufacture of storage batteries. The amount used for cable covering has been a close second, however, and the amount used in the non-metallic form as white lead and red lead is not far behind the amount used for cable covering. These three uses account for well over half of the lead consumption. Some of the other large outlets are for ammunition, foil, bearing metal, solder and type metal.

The two largest uses of zinc are for galvanizing and brass making. These outlets require about two-thirds of the zinc production. Zinc-base die castings and wrought zinc products for use in dry cells and other purposes are other important outlets. In addition, a considerable amount of zinc is used in the non-metallic form for white pigment and rubber filler.

Aluminum is fourth in the order of non-ferrous metal tonnage. It is also a most versatile metal. It is unique because it is the most important light weight metal. Its principal outlets are in the transportation industry, including automobiles, buses, trucks, aircraft, rail and marine applications; the electrical industry; and the kitchen utensil and home appliance field. It is used generally, however, in all industries in its various forms including foil and paint.

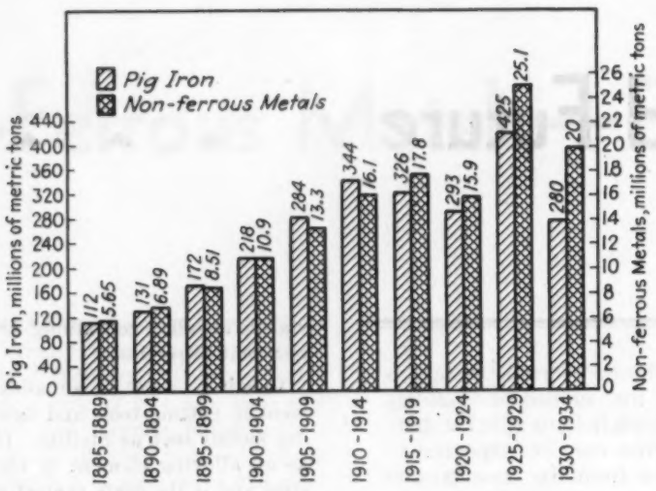

Fig. 1.—The production of pig iron and new non-ferrous metals for the past fifty years. The non-ferrous scale is twenty times that of pig iron to better illustrate the trend changes. In the last five years the ratio of non-ferrous metals production to pig iron has increased materially.

Magnesium is the one other light weight metal which finds application in the substantially pure form and as a base for light weight alloys. It is used mainly in the aircraft and automotive fields. While it is gaining new applications, it is still used for flash light and pyrotechnic purposes.

The largest use of tin is in the manufacture of tin-plated steel or so-called "tin-plate." Tin is also used as a base for the babbitt bearing metals and it is the principal alloying element with copper in the production of a variety of both cast and wrought bronzes. It is widely used in solder. Its non-metallic salts have a substantial use, particularly in the manufacture of white enamels. It is used in moderate amounts in the manufacture of die castings, as an alloying element, for foil, and for collapsible tubes.

The largest single use for nickel is as an alloying element mainly in the manufacture of special steels. It imparts peculiar properties to iron, the so-called "invar" alloys having very low coefficients of expansion, and Permalloy having a very low magnetic hysteresis. It is an important alloying element with copper in the production of the nickel silvers and Monel metal. It is the base metal for Nichrome, an important resistance metal for electric heating. It is used in large quantities for the production of electrolytic nickel plate on other metals, but it has a considerable use in the substantially pure state in the form of wire, sheet and other wrought products.

No Danger of Non-Ferrous Metal Shortage

So much about non-ferrous metals today. How about tomorrow? De Launay in 1908 suggested a normal order of metal exploitation as follows: "If we visualize any one of these new countries whatever, we see it, on the average, realize successively an age of gold, then of silver, then of copper, then of lead, then of zinc, and then of iron." In 1929 Hewett extended De Launay's generalization for non-ferrous metals and suggested the diagram shown in Fig. 2. Hewett wrote, "This diagram indicates five stages, shown by successive culminations of (1) the quantity of exports of crude ore, (2) the number of mines in operation, (3) the number of smelters or refining units in operation, (4) the production of metal from domestic ore, and (5) the quantity of imports of crude ore. In suggesting these five successive stages in the life of metal industries, I do not insist that the order is invariable over a wide range of history or over the entire world, for fortuitous discovery and sundry acts of government can

slightly change the order temporarily. I merely urge that this is the normal order of the past in most regions with which I am familiar. It is well shown in most of the European countries with domestic fuel supplies. No significance is to be attached to the relative heights attained by these curves; I wish only to emphasize the successive relation of the peaks."

Both De Launay's and Hewett's sequences depend largely on the rapid depletion of the richer ore bodies.

Applying these generalities, it would appear that most of Europe and the United States are in the age of iron in De Launay's sequence and in the last stage of Hewett's succession. Two whole continents, on the other, Africa and South America, are still in the age of copper and in the second of the five of Hewett's stages.

Notwithstanding many predictions to the effect that the civilized world would, in the not distant future, be scrambling for copper, lead, and zinc ore, the best evidence is that this generation and the next will be blessed with ample supply. Furthermore, a study of supply and potential demand leads to the conclusion that the present generation is not confronted with a shortage of any significant non-ferrous metal.

F. W. Clarke estimates that the earth's crust contains only about 0.01 per cent copper, 0.004 per cent zinc, and 0.002 per cent lead. Some of the other metals are present in even smaller quantities. It seems axiomatic that the exhaustion of the richer ores of these metals will, in time, profoundly modify metal economics. This is, however, one of the burdens which we can safely transfer to the shoulders of coming generations. The changes will come gradually and as any particular metal becomes more scarce it will sell at higher prices and will be used more sparingly.

Iron and aluminum comprise about 5 and 8 per cent respectively of the earth's crust. Although the richer and most available ores of these metals will in time largely be exhausted, the leaner deposits are inexhaustible. Since the largest tonnages of metal find outlet for structural purposes, it is most fortunate for our descendants that these two metals make a potent structural team.

Although forecasting is hazardous, there is some comfort in making predictions for the remote future. Not only is the forecaster relieved of much embarrassment, but the predictions are not necessarily less accurate because of the long time period. It can, for example, be predicted with considerable assurance that everyone now living will be numbered among the deceased a hundred years from now. If we try to predict the mortality charts of particular individuals during the next 20 years, there is equal assurance that the forecasting will be faulty. And so it is that one can be more sure of the attainment of certain relationships among the metals than of the rate and order of change. Some of these long-time relationships are (1) the time cannot be visualized when any metal will even be a close second to iron, from the tonnage standpoint, (2) new non-ferrous metal production should increase in comparison with new iron production at least for several generations, (3) aluminum will eventually be the largest tonnage non-ferrous metal, and (4) the time cannot be visualized when any of the major non-ferrous metals will be so far exhausted as to rob industry of the richness in variety and combinations of properties which they make possible.

Turning to the near future, it is evident that metal consumption will not change dramatically in kind "over night." The adjustments which have been established by the rigorous economic processes may be assumed to reflect an approximate temporary balance. The salvation for one industrial metal is the salvation for all industrial metals, namely, greater metal consumption. For the near term, metal consumption depends on the state of business more than on anything else. In this respect ferrous and non-ferrous metal production goes up and down approximately together. Healthy business conditions are therefore essential for a healthy metal industry.

If an attempt is made to picture the probable changes during the next two or three decades, one is confronted with the same uncertainties as in predicting individual mortalities. Changes in human habits, new ore discoveries, improved methods of metal recovery, alloying, heat treatment, protective coatings and the like will affect the use of metals. The past should, however, serve as an approximate guide to the trend because these changes have been going on since the beginning of history. The following general observations are offered for what they may be worth.

(1) In the future use of metal, it is practically certain that the engineering suitability of non-ferrous metals will be in much greater proportion to iron than the present and recent past ratio of the consumption of these metals.

(2) It is equally certain that the cost factor, which is often the dominating one in metal selection, will give iron preference over non-ferrous metals in many applications where the latter enjoy better engineering suitability.

(3) In selecting metals in the future, engineering suitability will gradually be given a greater weight as compared with cost.

Greater Use of All Metals Is Probable

Another factor in the use of metals in the next few decades can profoundly affect not only the total consumption of metals but also their relationships. It is the industrialization of the Far East and backward countries. If the remainder of the world consumed as much metal per capita as western Europe and North America the consumption would be multiplied by about five.

We cannot hope to see such a drastic change in our lifetime. A change in this direction, however, is in process as evidenced, for example, in Japan. From now on there will be pressure exerted on the more backward countries from two sides instead of one—a sort of closing-in movement with America and Japan pushing the movement westward and Europe pushing eastward. We can, therefore, hope to see a further substantial consumption of metal in the backward countries.

Such a change in the early phases would not in itself be expected to change the relationships among metals materially. If and when the change

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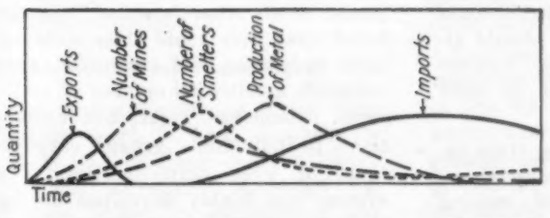

Fig. 2.—A normal sequence of changes in production of non-ferrous metals in countries having fuel supplies. The heights of the curves have no significance.

III—DICTATED ECONOMIES;

THE mercantilist economy of the later middle ages presents many similarities to the programs of latter-day economic planners. Also, many of its features suggested that it was derived in considerable measure from the systems that Diocletian and his successors had imposed on the later Roman Empire.

Based on the assumption that each state ought to be as nearly self sufficient as possible, it naturally grew out of the intense nationalism of the times. The rulers wanted to bring into their country the largest possible amount of the precious metals; some of them seemed convinced that these were the only worthwhile forms of tangible wealth. The merchants wanted to expand their foreign trade as much as possible, but wanted to do this without surrendering to foreigners any corresponding share in their domestic market. Foreign trade was esteemed much more important than domestic trade, provided it could be so controlled that there should always be a large "favorable" balance of trade to be liquidated in hard money.

To attain these ends, the state intruded itself into all commercial activities, passing laws and making regulations that were intended to favor the industries and trade of the country at the expense of all outsiders. Prof. Carlton J. H. Hayes finds that the basis of the mercantilist program is "a condition of mind among the members of the nation, in which loyalty to the ideal or to the facts of one's national state is superior to all other loyalties." In the belief that they could thus build up their industries and commerce, governments granted all manner of privileges, monopolies, rights and exemptions, to individuals, groups, corporations or even municipalities. The system was highly developed during the later middle ages but broke down

Yesterday, Today and Tomorrow

when the modern industrial age opened, with its ideals of free competition and open industrial opportunity. But in the communism of Russia, the corporative state of Italy, the national socialism of Germany and the New Deal program of the United States, will be found many evidences of a disposition to return to this outworn and discredited system.

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Managed Economy Under Henry VIII

The managed economy of the mercantilist epoch perhaps reached its climax in England under Henry VIII and Elizabeth. Although the program looked to establishing national self-sufficiency by encouraging industry and commerce, the measures taken by Henry decidedly did not promote these aims.

English artisans and craftsmen were then much less skilled than those of the continent, and many foreign workers came into England. England greatly needed them, but there was protest by the native workers who complained that the foreigners took their employment from them, were able to get better wages, and that because of this the prices of necessaries was unduly increased. The king himself declared that the foreigners were starving his people and causing much crime. Certainly crime was rampant, for at one time there were 60,000 people in the prisons, and it is stated that 72,000 criminals were executed during Henry's reign for theft and robbery.

Wage and Price Fixing

To appease complaint, laws were passed fixing the wages of artificers, prohibiting luxury in apparel, and empowering the ministry to fix the prices of poultry, cheese, butter, beef, pork, mutton and veal. Agriculture was so rudimentary that it was more profitable to raise sheep, so the tilled lands were turned into pasture and enclosed, the people being forced to move into the cities and towns. To prevent abandonment of farms in this way, it was enacted that if a farm house was allowed to fall into decay the king should be entitled to half the rent of the farm.

Henry Tudor had as definite views about preventing agricultural overproduction as has our Henry Wallace. A law was passed providing that no proprietor should keep over 2000 sheep; the preamble setting forth, as a grievance, that some had as many as 24,000. Very curiously, this same law says that the enormous increase in the number of sheep had made the price of mutton go up, rather than down; the explanation being that the industry had fallen into a comparatively few hands, and those who controlled it were able to exact monopolistic prices. The historians find some justification for this complaint, inasmuch as the managed economies of the time had brought the ownership and control of land into the hands of a much smaller number of people, favorites of the ruling and planning power.

A great number of laws were passed under Henry VIII granting monopolies and confining particular manufacturers to particular towns or areas.

A Rapacious Tax Gatherer

Henry was a rapacious tax gatherer, but like all orthodox economic planners could never get enough revenue so he was always in financial trouble. Finally he debased the coinage, with the inevitable consequences. The good specie was hoarded or exported; cheap money was coined for use at home; and the common people, receiving their wages in it, lost their

purchasing power, causing a universal stagnation of commerce.

The people's complaints were so serious and constant that it was enacted that anybody criticising the King or royal family should be guilty of treason. As a general result of all these interferences with free industry and the rights of the individual, one law of King Henry declared that "many and the most part of all the cities, boroughs, and towns corporated, within the realm of England, are fallen in ruin and decay and are not inhabited by merchants and men of substance."

English history of this period is a continuing series of testimony to the impossibility of managed economy. Under Henry III the merchants of the Hanse towns had well-nigh monopolized the foreign commerce of England, and had become so powerful that they were granted corporate charters closely analagous to our NRA codes which gave them many privileges. Practically the entire foreign commerce of England fell into their hands, and as they used their own ships, the ship building and navigation interests of England suffered. But despite much complaint, these charters continued in force more than 300 years. The special interests that had been able to get special privileges from the economic planners managed, generation after generation, to have these advantages continued. That, of course, is one of the grave weaknesses of any scheme of economic planning; under it, some groups or interests are bound to get preferred treatment; and once they get it they hang on like grim death.

The Merchant Adventurers' Code

Ultimately the Merchant Adventurers of England got themselves a code that conflicted sharply with the special privileges of the Hanse Town merchants and the latter, who had long tried to maintain their monopoly, complained bitterly. Whereupon the Merchant Adventurers went vigorously to bat in defense of their practices, explaining that although they were a pretty tight association, they really weren't a monopoly; far from it. They were a high minded and patriotic lot, as they admitted in these terms:

> The said merchants do saye that they neither do keepe or intend to keepe, nor in former tyme have kept, a monopolie in their trafique at Embden or elsewhere. A monopolie, as they thinke, is whereas one man or many men of one company or association, do engrosse or buye uppe one or dyverse sorts of merchandise and so sell the same again to their private gaine, to the disapoyling of all others of that first buying and sellings of those merchandizes.
>
> The said merchantes adventurers have of themselfes a governour and fellowship incorporated for mayntenance of goode maners and lawful and orderly buyings, sellinge, and ordynarie tyme of shippinge, etc., all of which are in mayntenance of the common welthe of their wholle contry and not in any unlawful prejudice of any other contry.
>
> They in all buyinge and sellinge of ther merchandizes have no buyinge or sellings in common, no factor or agent of their common charge or for them in common in any wise. But every man a parte of his owne particler stock and devise, doth buye and sell to his owne use as secretly from the knowledge of others of the Fellowship as he cann; and doo endevour by all lawfull means one to prevent and other in buyinge and sellinge of all their merchandize as mere strangers one to another. There is no sett of lymyted pryce among them for buyinge or sellinge any comoditie, and in all experience yt is founde they buye and sell at different pryces one from an other of the same merchandize.

In this era the manufacture of woolen cloth was one of the most important English industries. The manufacturers enjoyed a variety of special and monopolistic privileges, but under Edward VI a law was passed prohibiting anyone from making cloth unless he had served an apprenticeship of seven years. Designed, of course, to strengthen the monopoly of those already entrenched in the business; its actual effect was to cause the industry to decay and a number of towns to which the planners had given special privileges in this industry were ruined. The law was repealed under Queen Mary, but it was actually reinstated under Elizabeth whose reign like that of Henry VIII was dedicated to managed economy.

The Commodity Farthing

But there were plenty of precedents, set up long before the first Tudor came to the throne. As far back as Henry II, in the twelfth century, there was set up in England what was called the "Assize of Bread." Its plan was that the weight of a farthing loaf should vary with the price of wheat. When wheat was cheap the farthing loaf was to be a generous one; but when the price of wheat was high the farthing bought a small loaf. The aim was to restrict the baker to a reasonable profit; but the effect too frequently was to restrict the people to smaller rations of bread; for when the farthing loaf shrank, the supply of farthings did not correspondingly increase; and when the price of wheat went down, there was a long lag before the loaf grew larger.

Assizes of ale and wine were also established, as was the assize of cloth, which determined the length, width and quality of cloth. A special officer, the Aulnager (code administrator) was set up to enforce the cloth assize.

Similar to the assizes were the measures to regulate wages. After the Black Death of 1348, which is reputed to have destroyed nearly half of England's population, there was a fearful scarcity of laborers and the economic dictators felt that something must be done about it. So the Ordinance and Statute of Laborers was adopted, requiring that laborers and craftsmen must not refuse to work for anybody who would pay them the same rate of wages that had prevailed before the plague. In order to equalize things this law also fixed maximum prices that could be charged for foodstuffs.

But statutes could not increase the insufficient supply of workers, nor add anything to the inadequate quantities

of food and other necessaries that were being produced. The price of food rose, partly because of scarcity and also because of the debasing of the coinage. Workers could not live on the old wages; and employers, despite the law, constantly bid against each other in order to get workers. The laws were unworkable and attempts to enforce them were finally abandoned; but to the extent that they were enforced they worked cruel hardships. Penalties of fines and imprisonment were provided, and in many cases the letter "F" was branded on laborers who had "falsely" broken faith with their employers and escaped to other service.

Some of the similarities between the old English mercantilist laws and the statutes set up by our own New Deal are so striking that it seems worthwhile to quote them in parallel

columns. Under Elizabeth, British seamen were active all over the world, especially in parts that were claimed by Spain as her exclusive domains. One of these regions was Barbary, for whose trade a long and bitter struggle was carried on. Spain and Portugal licensed their traders into Barbary; and the British traders demanded that they also be placed under license and all unlicensed persons excluded from this trade. It was a fine little monopoly that Elizabeth set up in this quarter, as she did many other monopolies in other fields; and the petition of the British traders for this monopoly is so similar to the licensing provision of NIRA (section 4b) that they are here set alongside:

Petition for a Licensed Monopoly in the Barbary trade

The Kynges of Spayne and Portyngall for menye greatt and wayghtie considerations suffreth none of theyr subiectes to trafyque into the Kyndom of barbarie in Affrice butt by speciall lycens; by means whereof theyr sayed subiectes, havying lycens and being knowen to be honest and expert merchantes, keep theyre trade into the sayed countrie in good order, which ys verie expedyent and nessesarye, beying in a londe of infidelles enemies to all Chrystians.

The sayed trade into barbarie ys now of layte greatlie frequentyd and occupied by englyshe men, whereof manye are so unscyllfull thatt, where the expert merchantes wear wonte to make theyr return in the same shyppes thaye sent theyr goods in, nowe ytt ys too yeres before theye can make theyr returne owt to thatt dangerous contrie. . . .

For remedie whereof and to mayntayne the sayed trade in good order, thatt ytt wolde please her majestie to graunt a lycens unde certain honestan expert merchantes to occupie and trafique into barbarie, forbydding all others her majesties subiectes and sayed trade butt only sutche as shall go under her majesties lycens. . . .

Licensing Provisions of NIRA

Whenever the President shall find that destructive wage or price cutting or other activities contrary to the policy of this title are being practiced in any trade or industry or any subdivision thereof, and, after such public notice and hearing as he shall specify, shall find it essential to license business enterprises in order to make effective a code of fair competition or an agreement under this title, and shall publicly so announce, no person shall, after a date fixed in such announcement, engage in or carry on any business, in or affecting interstate commerce, specified in such announcement, unless he shall have first obtained a license issued pursuant to such regulations as the President shall prescribe.

The President may suspend or revoke any such license, after due notice and opportunity for hearing, for violation of the terms or conditions thereof. . . .

Whoever will struggle through these examples of old English and modern English, will at least be convinced that some of the Brain Trusters, after all, must have read selected bits of economic history!

But after all it was Elizabeth's uxorious parent, Henry VIII, who provided the most startling of royal precedents for New Deal policies. Henry decreed the debasement of the currency in order to make British money as bad as French and Dutch money; precisely as the New Deal devalued our dollar, in order to get it down nearer to a parity with British and French money. Here are the two statutes:

Decree of Henry VIII Debasing English Coinage

For as much as Coynes of moneys as well of gold as of silver be of late dayes raised and inhaunced both in the realme of Fraunce and also in the emperours Low Countries and in other partes unto higher prices than the very poiz, weight, finesse and valuacion of the same, and otherwise then they were acceostumed to be curriant, by means whereof the money of this our realme is daily and of long season passed bene by sundry persons, as well our subietes as strangers, for their particular gayne and lucre convey out of this realme into the partes beyond the seas, and so is likely to continue more and more, to the great hinderaunce of the generality of our subietes and people and to the no little impovrishment of our said realme, if the same be not speedely remedied and forseene; we afterlong debating of this matter with you and sundry others of our councell, and after remission made unto outward princes for reformacion thereof, and finding finally no manner of remedy to be had at their handes, have by mature deliberacion determined, that our coynes and moneys as well of gold as of silver shalbe by our officers of our mente from hencefoorth made of such finesse, alloy, standard and value, as may be equivalent, correspondent and aggreable to the rate of the valuacion enhaunced and raised in outward partes, as is afore specified.

Agricultural Adjustment Act Provision for Devaluing the Dollar

Whenever the President finds upon investigation, that (1) the foreign commerce of the United States is adversely affected by reason of the depreciation in the value of the currency of any other government or governments in relation to the present standard value of gold, or (2) action under this section is necessary in order to regulate and maintain the parity of currency issues of the United States, (3) an economic emergency required an expansion of credit, or (4) an expansion of credit is necessary to secure by international agreement a stablization at proper levels of the currencies of various governments, the President is authorized, in his discretion . . . (the inflation rider follows, providing for reduction of the gold content of the dollar and credit expansion).

The mercantilist dictated economy was perhaps more like the managed economies of today, than was any other system in the ancient and medieval world. In each country the government elbowed itself into dominance of industry and trade, through grants of monopoly, privilege and licenses and the inevitable result was intensification of the spirit of nationalism. There was the same competition among nations in debasement of their currency, as we have seen since the world war. The English charged that continental countries had

started this race for cheap money, and Henry blamed them for forcing him in turn to debase his coins. With cheaper money thus taking the place of dearer, there was the inevitable tendency of better money to go into hiding or to leave the country and so Edward VI, successor to Henry, had to forbid the export of gold and silver. This was done by reviving an old law forbidding such exports. Here is the British sixteenth century non-exportation provision, alongside the New Deal measure of similar purport:

Law of Edward VI Against Exportation of Gold and Silver

. . . the Coyne of this Realme hathe and daily ys and has been carryed and conveighed into France, Flaunders Normandye Brytany Ireland and other parties beyond the Sea . . . to the great impoverisment of this Realme. . . . Be it therefor enacted by auchtorite of this present Parliament that the sayd Statute and Ordinnance . . . shall be affirmed and enacted to be good and effectuall from the first day of May next coming and tendure to thende of XXti yeres than next following.

New Deal Act Authorizing Prohibition of Gold and Silver Exports

During time of war or during any other period of national emergency declared by the President, the President may, through any agency he may designate, or otherwise, investigate, regulate or prohibit, under such rules and regulations as he may prescribe, by means of licenses or otherwise, any transactions in foreign exchange, transfers of credit between or payments by banking institutions as defined by the President, and export, hoarding, melting, or ear-marking of gold or silver coin or bullion or currency, by any person within the United States or any place subject to the jurisdiction thereof. . . .

Price and other drastic regulations caused exactly the same kind of chiseling under the Tudors as today; the charters granted to trades and industries were substantially similar to our codes; and so when chiseling started the same sort of preventive measures were adopted as under NRA. Thus in 1550 the people of Cornwall protested that the dealers were charging scandalously high prices for foodstuffs, and the Justices of Cornwall were ordered to find out who had been charging excessive prices. The Justices were to send for the chiselers, listen to their stories and "if it shall then appear they have offended, then to give them a day, under sureties, to appear before them to receive their deserts." An' that was sumthin', for cracking down under a Tudor was likely to mean cracking heads.

But still it didn't work. The Merchant Adventurers in 1584 complained to Queen Elizabeth's government that their codes were breaking down, observing that "by late experience it is founde that the dispersinge of the trade, and breakinge of the government thereof, hath and doth not only hinder the utterance of our clothes, but also abase the prises and estymacion thereof. . . ."

This complaint of the clothing manufacturers arose out of the fact that they had one code, while the dealers in wool had another, and the wool people were out to soak the consumer. A petition for redress of grievances in 1557 declared that:

> Many persons, which proceur Licences to by and sell wolle within the Realme, or to transporte the same beyonde the Seas, do under collor thereof get into their handes great quantities of wolle, more than the rate in suche licens conteyed do warrant, and soe doe sell the same agayne at excessive pryses to the clothe men in the Realme.

Wage Differentials in the 14th Century

Certain NRA codes provide wage differentials between different sections of the country; Southern wages being lower than Northern. It is interesting to discover exactly the same scheme in England in the fourteenth century. Recognizing differing conditions in different parts of the country, Parliament authorized justices of the peace to fix wages in their localities according to conditions. The measures worked no better than they appear to do now, but the planners were so bent on them that over a couple of centuries laws were repeatedly enacted to put stout teeth into them. But no dental equipment was ever devised that made it possible to masticate the problem.

A Code of Fair Competition

One of these measures, in 1662, might have been the model for our legislation providing for codes of fair competition. Under it, as described by one writer

> a corporation of Broad Woollen Clothiers was set up consisting of all the justices of the West Riding together with two masters, ten wardens, twelve assistants and the commonalty. It was vested with powers of making by-laws for "the better spinning, working, making, fulling and milling of woollen cloth" which might tend to "the good credit and advancement of the trade." It was also to appoint searchers of cloth, who could enter any house, workshop or warehouse of clothiers, drapers, and cloth-workers in order to inspect the cloth "that it be of a due weight, length and breadth according to the statute."

Associations of this kind were charged with taking advantage of their monopolistic privileges. One contemporary writer says of them that "most of our ancient corporations and gilds (are) become oppressive oligarchies." Price agreements were entered into among the members of each association, by which the trade could charge whatever it liked. This statute was the beginning of the effort of regulation through cooperation of the industry and the government. In earlier times the government had tried to impose its regulations on industry, with little success because the administrative officials became careless or corrupt and the rules were not enforced. Later, when the plan of cooperative regulation, by the state and the industry, was tried, the tendency was toward a static situation in which enterprise and initiative were discouraged; the trade associations abused the monopoly power given to them and the public suffered.

(To be continued)

New Trade Publications

Valves, Injectors, Gages and Columns.—Yarnall-Waring Co., Chestnut Hill, Philadelphia. Bulletin WG-1803, 16 pages, 8½ in. by 11 in. Description of Hi-Lo alarm water columns,. including drawings and parts list. Like treatment covering pressure gages, water columns and flat glass inserts. Cuts of installations and list of users.

Cemented-Carbide Tool Grinding. — Carborundum Co., Niagara Falls, N. Y. Booklet—The Grinding of Cemented Carbides—52 pages, 5 in. by 7 in., compiled in cooperation with Carboloy Co., Inc., Firth-Sterling Steel Co., Henry Disston & Son, Inc., Thomas Prosser & Son, Vascoloy-Ramet Corpn., Westinghouse Electric & Mfg. Co., and William Sellers & Co., Inc. Features the cemented carbides, their characteristics, the grinding and lapping problems which their use presents including drawings of set-ups and gripping technique for properly holding. Covers factors affecting grinding wheel action and illustrates the different types of cutting edges. Also deals with such products of the Carborundum Co. as are available for grinding cemented carbides.

Worm Gear Drive Unit.—Revolvator Co., Jersey City, N. J. Bulletin covering combination motor and herringbone worm-gear drive with magnetic brake and cable drum inclosed in one housing.

Electric Drill, Portable.—Chicago Pneumatic Tool Co., 6 East Forty-fourth St., New York. Bulletin. Hicycle-squirrel cage induction motor. Operates from 220 volt, 3 phase, 180 cycles. Designed for holes up to 3/16 in.

Lubricators.—Hills McCanna Co., 2349 Nelson St., Chicago. Bulletin, 8 pages. Cuts and drawings of various inclosed models of force-feed lubricator, together with Hills-McCanna individual lubricant feeds, couplings and valves.

Abrasives.—Norton Co., Worcester, Mass. Booklet, 5 in. by 7 in., 27 pages. Abrasives—Their History and Development. Outlines the introduction of grinding into the machine, paper, building, stone, and process industries. Treats of early experiments, later developments, progressive discoveries and processes through which physical properties may be varied. The particular products of Norton Co., including Alundum and Crystolon, together with grain sizes and symbols, are conveniently covered.

How Attractive Finish Helps Metal Products Sales

27—The Design of Polishing and Buffing Fixtures

By ROBERT R. KENT

IN a paper before the Machine Shop Division of the American Society of Mechanical Engineers in 1930, the writer listed the essentials of a properly designed work-holding fixture for polishing and buffing machines as follows: 1. It must so hold the work that it cannot become dislodged when it comes in contact with the wheel. 2. It must be easy to load and unload. 3. If the fixture is loaded at the bench and transferred to the machine, it must be light, yet rigid. 4. It must have provision for compensation for wear, and in those pieces where the fixture masks a portion of the work for one reason or another, the masking part should be capable of easy replacement. 5. The fixture should be so made that it can be placed on the machine in one position only. The failure of many fixtures to function properly is due to neglect of one or more of these essentials.

Polishing and buffing fixtures divide naturally into two classes: 1. Those for holding work which is rotating, while in contact with the wheel. 2. Those for holding work which moves in a straight line past the wheel. The latter type generally finds its principal application in straight line machines, although there are some adaptations of machines designed primarily for rotating the work, where the work is passed in a straight line against the wheel.

Fixtures also can be classified by the method employed to hold the work. Eight headings thus may be listed: 1. Internal expanding fixtures which grip the work internally by the expansion of suitable jaws. 2. External contracting, which grips the work externally by the contraction of suitable jaws. These two types may be designed for both the rotating and the straight line machines. 3. Friction fixtures, in which the grip on the work is obtained by friction alone. 4. Recessed fixtures, in which a recess is formed of the same shape as the work and from which projects the surface of the work that is to be finished. Sometimes recessed fixtures may be of very elaborate form, while in others they may be simply cleats between which the work can be laid. 5. Eccentric fixtures in which the work is gripped by means of an eccentric mounted on the axis of rotation of the work. 6. Contour fixtures, for presenting work of more or less irregular contour to the polishing or buffing wheel. 7. Fixtures that hold the work by means of vacuum, commonly called vacuum chucks. 8. Magnetic chucks.

All of the foregoing fixtures may be loaded at the bench or on the machine, depending on the character and quantity of production of the work. They all may be, when loaded on the machine, either hand operated, full automatic, or semi-automatic. The full automatic fixture locks the work in position, and unlocks and unloads it at the completion of the finishing operation without any attention from the machine operator excepting the placing of the work on or in the fixture. The semi-automatic fixture may either lock or unlock the work, the operator performing the other operation by hand.

THE possibility of putting work on automatic polishing and buffing machines, thereby effecting large reductions in costs, usually depends upon the ability to design a fixture that will hold the work securely and present it to the polishing or buffing wheel in the proper manner. Some of the practical considerations in the design of fixtures for production work are described in this twenty-seventh article of a series on metal finishing. Mr. Kent is consulting engineer, 32 West 40th St., New York.

Quantity Determines Design

In undertaking the design of fixtures one of the principal points to be considered is quantity of production in connection with the capacity of the machine. Quite frequently the length of application of the wheel to the work is so short as to preclude the possibility of loading several pieces in the fixture and locking it in the interval that is available between successive operations. At the same time the quantity of production may be such that holding a single piece in a fixture would so cut down the capacity of the machine that the required production would be unobtainable. In such an event a fixture separate from

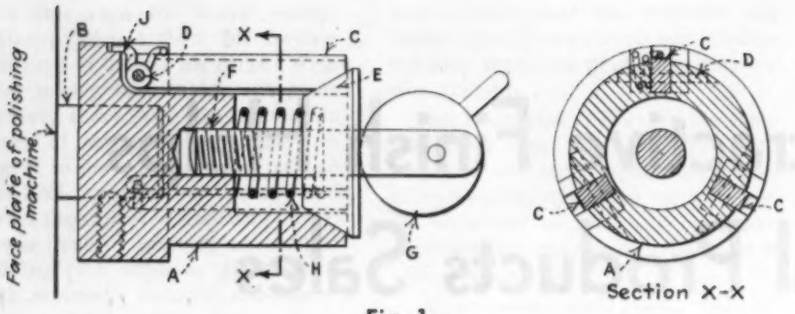


Fig. 1

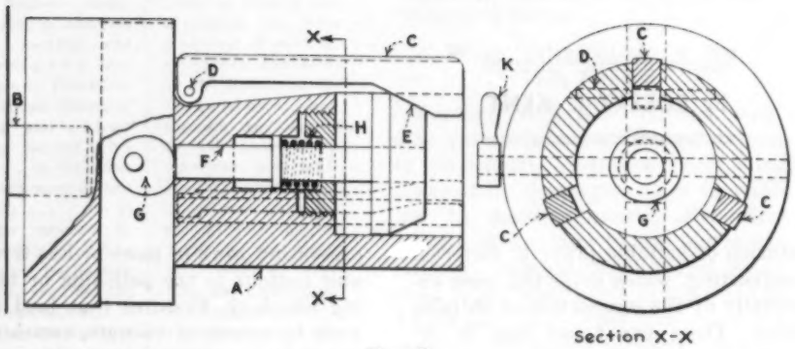


Fig. 2

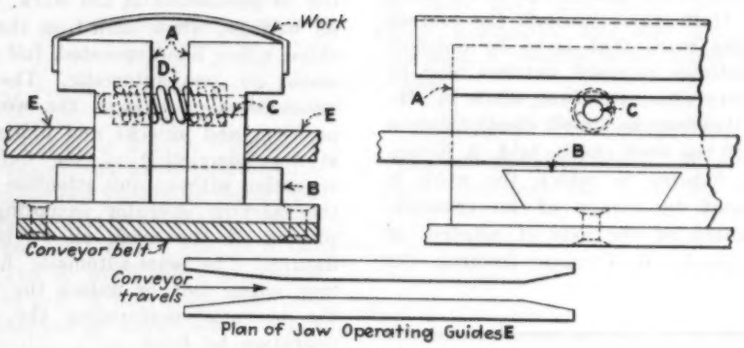


Fig. 3

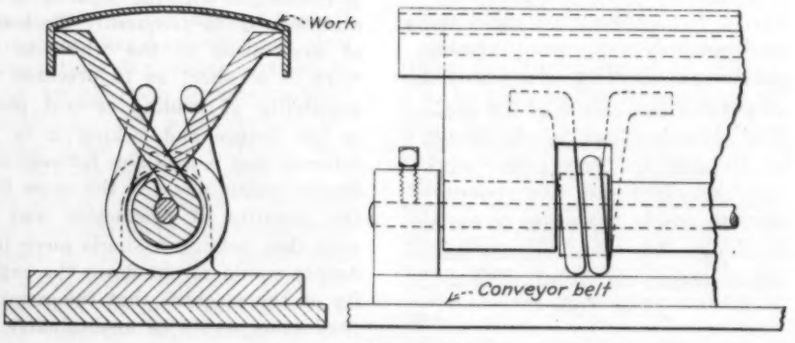


Fig. 4

the machine, which can be loaded and unloaded at the bench, is indicated, being transferred to and locked on the machine when loading is completed. Such a procedure usually calls for two or more loaders for a machine or battery of machines. Since loaders are far less costly than polishers or machine operators the increase in production obtained by the use of multiple fixtures more than compensates for the extra cost of the additional personnel.

Another point to be considered is the adapting of one fixture to various types of work. For instance, the total volume of work might warrant a considerable investment in rotating type polishing and buffing machines. On the other hand, the quantity of each particular item that would be manufactured at any one time would be so small, and the number of different items involved would be so large, that the expense of fixtures for all of the items would be prohibitive. Frequently, however, it is possible to design what is termed a master fixture in which is contained all of the mechanism for locking, unlocking and unloading the work. To this master fixture are fastened adapters or chuck jaws, operated by the master fixture, which will hold any given piece of work of the same general class. The expense of equipping for a large variety of work can thus be materially reduced, since the adapters can be made for a small fraction of the cost of a complete fixture.

The following illustrations show some fixtures of several of the classes outlined above. Fig. 1 is an internal expanding fixture that may be used for circular work on a rotative type of machine. It consists of the main body *A* set-screwed to the rotating spindle *B* of the machine. Three longitudinal slots at 120 deg. apart are cut in the body *A*, in which are fitted three narrow expansion bars or jaws *C*. These are hinged at the inner end on pins *D* and beveled at the outer end to conform to the angle of the cone *E* which slides upon the stud *F*, screwed into the body of the fixture. The outer end of the stud *F* is slotted and carries an eccentric *G* which bears against the outer surface of the cone *E*. The work to be finished is slipped over the body of the chuck until it bears against the shoulder at the inner end. This shoulder is so positioned that when the work is in contact with it, the work is in the proper relation to the polishing wheel. The eccentric *G* is then turned to the opposite position from that shown, forcing the cone *E* inwards against the bevel of the jaws *C*, and causing

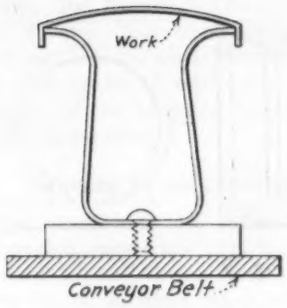


Fig. 5

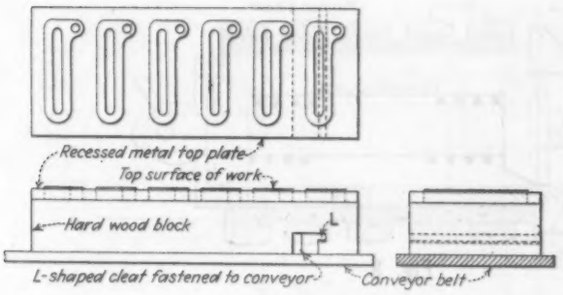


Fig. 6

them to move outwards and grip the work. When the position of the eccentric is reversed at the completion of the finishing operation, a spring *H* wrapped around stud *F* forces cone *E* outwards, and springs *J* around each of the pins *D*, moves the jaws inwards thus permitting the work to be removed from the fixture.

Fixtures for Bearing Races

The type of fixture shown in Fig. 1 with its cam locking device is applicable only to open end work, that is work which is in the nature of a ring or a ball bearing race. For work with a closed end, for instance, a deep drawn shell or a cooking utensil, a modification of the fixture, as shown in Fig. 2, could be made by attaching cone *E* to the outer end of the stud *F*, and hinging the jaws *C* at the inner end of the fixture. The angle of the cone is reversed from that in Fig. 1. The stud *F* is moved axially by the eccentric cam *G* located in a slot at the rear end of the body *A*. The cam is operated by the lever *K* attached to the camshaft.

The fixture in Fig. 2 could be made to lock and unlock automatically by providing a hollow spindle on the polishing machine, through which stud *F* would etxend. The cam *G* would be omitted, but in its place a fixed cam would be placed in the head of the polishing machine. This cam would be so located as to move stud *F* outwards as the fixture indexed into position for presenting the work to the wheel. At the conclusion of the operation, as the fixture indexed away from the wheels a reverse curve on the cam would permit stud *F* to be retracted by the spring *H*, thus releasing the work. If desired a spring-operated knockout could be attached to the outer end of the fixture to unload the work as soon as the jaws *C* release it.

Fig. 3 is an internal expanding fixture for a straight-line machine. This fixture is designed for holding metal backs of loose-leaf notebooks, while being buffed. It comprises essentially two L-shaped jaws *A*, set back to back and sliding upon a suitable base *B*. The illustration shows a dovetailed slide, but any suitable form of slide may be used. Dowels *C* in one jaw fit into corresponding holes in the opposite jaw and around these dowels are helical springs which compress into recesses in the jaws, and serve to force them apart.

In operation, as the fixture moves along on the conveyor of the straight-line machine, it passes between tapered guides *E*, which force the jaws together, compressing the springs *D*. While in this position the work to be finished is laid on the top of the jaws. The further movement of the conveyor carries the jaws out from between the tapered guides, whereupon the compressed springs *D* expand and force the jaws apart, thus locking the lips against the edge of the work and holding it firmly while it passes under the wheels. The fixture is unloaded by causing it to pass between another pair of tapered guides while passing around the head pulley of the conveyor. The jaws being brought together, the work slides off them as they pass around the pulley and drop into a tote box.

Holding With Spring Steel

A variation of this construction is shown in Fig. 4 where the two lips are on the edges of hinged sections which are forced apart by springs. The same arrangement of tapered guides may be used for opening and closing them. Where the nature and quantity of the work do not warrant elaborate or expensive fixtures, the same result may be accomplished by a piece of spring steel bent into appropriate form as shown in Fig. 5.

Figs. 6 and 7 are examples of fixtures loaded at the bench and then transferred to the machine. Fig. 6 is a recessed chuck for a straight-line machine. The fixture comprises a block of hardwood, on the upper surface of which are fastened metal cleats which fit into the slot of the work and also metal plates which conform to the outer dimensions of the work. The thickness of these plates is such that they allow only enough of the work to project above them as is necessary for the proper action of the polishing wheel. The reason for this is that the edges must be held square, and were the polishing wheel allowed to come in contact with the edge of the work as it approached it, the edge would be rounded over and the appearance of the work destroyed. An L-shaped slot, extending the full width of the block is cut in the under-surface of the fixture. This slot fits over an L-shaped cleat on the conveyor which serves both to drive the fixture under the wheels and by reason of the projecting lug *L* prevents it from being picked up and thrown by the wheel. Each fixture holds six pieces, and inasmuch as the machine is capable of passing upwards of 250 pieces per minute under the polishing wheels, it is evident that only a detachable fixture loaded at the bench by a corps of loaders could utilize the full capacity of the machine.

Fig. 7 is a fixture used for buffing circular rings. It comprises the hol-

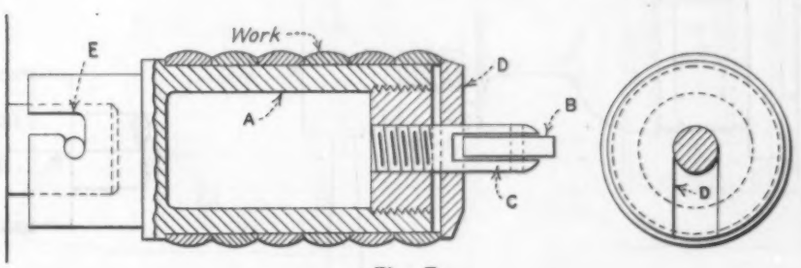


Fig. 7

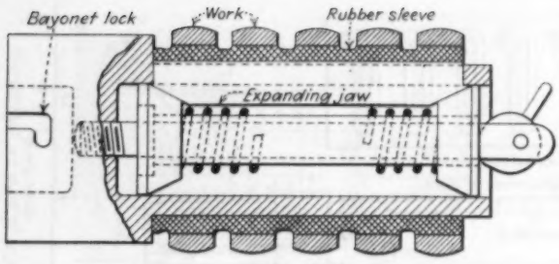


Fig. 8

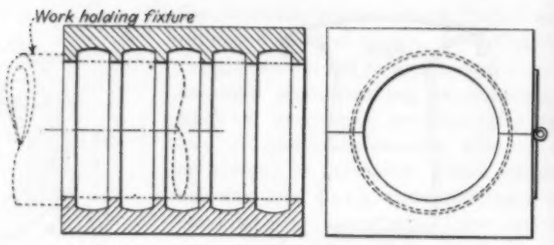


Fig. 9

low body *A* upon which the work is mounted, a number of pieces being strung along in contact with each other, the innermost one being against the shoulder. On the outer end of the fixture is a slotted stud *C* carrying an eccentric *B*. When the body *A* has been filled with work, a heavy C-washer *D* is slipped over the stud and clamped by the eccentric *B*. The pressure exerted by the eccentric upon the C-washer forces the several pieces of work firmly against each other and against the shoulder at the inside end of the fixture body. The fixture body is recessed at its inner end to fit on the spindle nose of the rotating polishing machine. It is locked thereon and driven by means of a bayonet lock *E*, which fits over a pin on the spindle nose.

Use of Rubber Sleeves

An interesting variation of this type of fixture is shown in Fig. 8. Here the problem was to finish a large number of pieces of the same external diameter but of varying internal diameter. The type of fixture shown in Fig. 7 cannot be used because the chuck body would necessarily be of the diameter to accommodate the smallest internal diameter of the work, in which event the larger diameter pieces would be eccentric to the fixture body and therefore would not be finished all over. A second reason is that it is necessary to finish clear down on the sides of the work to the inside diameter and this cannot be done with the pieces forced against one another. Without going into the details of construction of the fixture, it may be stated that the idea involved is the same as in Fig. 1, that is, internally expanding jaws actuated by cone and cam. To compensate for the variation in inside diameter, a sleeve of soft rubber is fitted over the fixture body, its outside diameter being equal to the smallest internal diameter of the work to be done. When the work is placed on the sleeve with spaces between the individual pieces as shown and the jaws expanded, the rubber is forced out sufficiently far to engage the larger diameter pieces. At the same time it is sufficiently soft and flexible to flow from under the smaller diameter pieces. The adjustment of the jaws is such that expanding them creates sufficient friction to drive the work when in contact with the buffing wheel.

Since the wheel will cut grooves in the spaces between the work, this form of fixture requires a loading device to insure the work always coming at the same relative position in the fixture. The loading device consists of a hollow box, Fig. 9, split in two halves, with the upper half hinged to the lower. The interior surface of the box is grooved to correspond with the position of the work in the fixture. To use the loading device, the work is dropped in the grooves of the lower half of the fixture, the upper half is closed down upon it and the fixture slipped through a hole in one end. When the shoulder of the fixture has been brought up against the end of the box, the locking cam is operated to expand the jaws and grip the work. The upper half of the cylinder is then lifted and the loaded fixture placed on the machine, being held by a bayonet lock.

Frequently when the area of the work is sufficiently large the friction between the work and fixture is sufficient to drive the work against the buffing or polishing wheel. Such a fixture is illustrated in Fig. 10, which is for a copper goblet buffed in a rotative type machine. The body of the fixture conforms to the interior of the goblet, and is a nice fit therein. The success of this type of fixture depends upon the maintenance of such pressure between work and fixture as will set up sufficient friction to resist the effort of the polishing or buffing wheel to spin the work on the fixture. This pressure usually can be supplied by an overarm attachment such as shown in Fig. 10. Here the attachment consists of a central stud rotating a spider with as many arms as there are working spindles on the machine. At the extremity of each arm of the spider a sliding shaft terminates in an end conforming to the shape of the work with which it is used. A heavy spring forces the work against the fixture and supplies the requisite pressure. A cam handle attached to the shaft mates with a similar cam on the boss on the spider. A half turn of the cam draws the shaft back from contact with the work, and

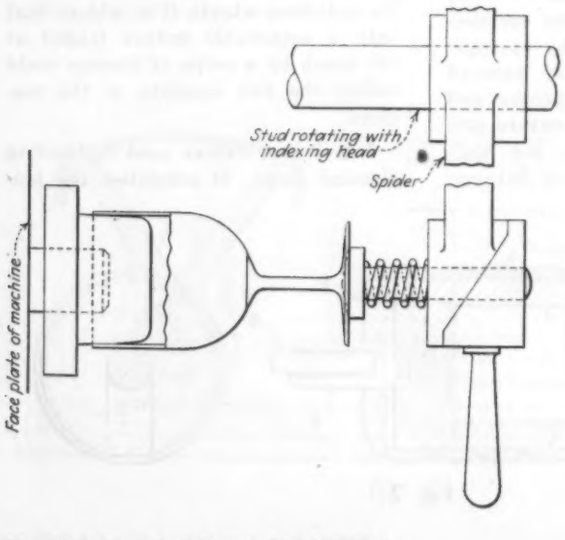


Fig. 10

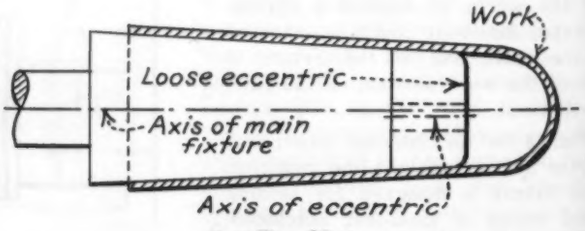


Fig. 11

permits the fixture to be unloaded. The reverse movement forces the shaft against the work. The stud rotates the spider in conformity to the rotation of the indexing head of the polishing machine.

Gripping by an Eccentric

The eccentric fixture shown in Fig. 11 consists essentially of a body, conforming to the interior surface of the work to be finished, mounted on a spindle which is rotated by the polishing machine. The top of the body is a loose piece free to rotate around an axis parallel to but slightly eccentric to the axis of the body. The first contact of the polishing or buffing wheel with the work tends to rotate it around the axis. The loose eccentric piece rotates with it and due to its eccentricity grips it as soon as it has made a small fraction of a revolution. The gripping action of such a fixture is very powerful, and considerable care must be exercised in laying out such a fixture. Usually some experimental work is advisable to determine the exact amount of eccentricity that will give sufficient driving power and yet not grip the work so hard as to make difficult its removal from the fixture. The work can be released by rotating it in the opposite direction from that in which it was rotated in order to lock it. If the gripping action is not too powerful, it may be forced off by causing it to come in contact with a pair of tapered guides which bear on the edge of the work on either side of the fixture. Such fixtures are designed for work too small for expanding chucks.

Not the least interesting of polishing and buffing machine fixtures is the class known as geared chucks. This type of fixture enables non-circular work to be polished or buffed in a rotative type machine. In Fig. 12, *A* represents the outline of an irregularly shaped article that is to be finished in a rotative type machine. The work is gripped in any conveient manner on a face plate which is attached to a base by supports *B*, which base carries a rack or internal gear *C*, the pitch line of which is exactly parallel to the perimeter of the piece *A*. This rack is driven by the pinion *D* mounted upon the rotating spindle of the polishing machine. The outer edge of the rack is parallel to the pitch line and therefore to the perimeter of the work that is to be finished. A roller *E* attached to the frame of the polishing machine bears against the outer edge of the rack. The centers of the pinion, roller and polishing or buffing wheel are in the same straight line. It is obvious that

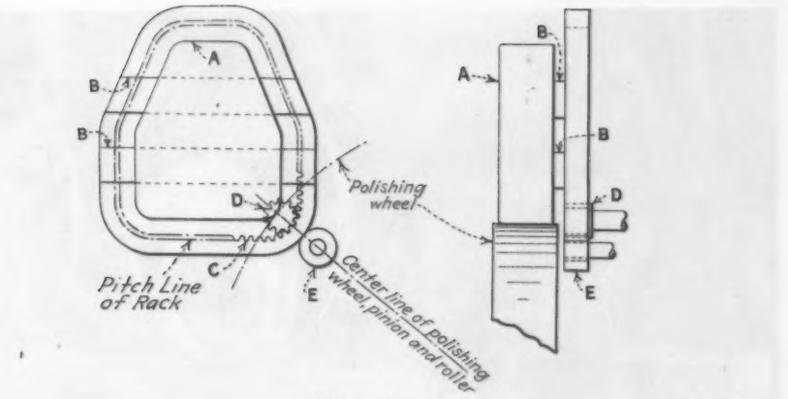


Fig. 12

as pinion *D* is rotated it will cause the rack to travel forward, and that as it moves, the roller *E* will constrain it to move in a direction parallel to the pitch line. The work, therefore, will move in the same direction, and since the polishing wheel is in the same straight line with the roller and pinion it will always be tangent to the work at all portions of its perimeter.

It is thus evident that pieces of quite irregular shape can be finished by means of a geared chuck providing there are no indentations in the perimeter of too short a radius to permit the polishing or buffing wheel to enter.

A limitation of this type of fixture is that the work must always be identical and conform in dimensions and contour within very narrow limits with the contour of the pitch line of the rack. Sometimes an inaccuracy in the chucks, jigs or fixtures used in the machining operations will cause a difference in dimensions of successive pieces that will render this type of fixture ineffective. Before the polishing fixture of this type is condemned for failure to function properly, a careful study and inspection should be made of the accuracy of machining.

An interesting type of fixture that does not fall within any of the classes enumerated earlier in this article is that shown in Fig. 13. This is a fixture to enable a straight line machine to finish automobile door hinges from the heel of the curved end and down on the blade the required distance. The earliest application of the straight line machine with a floating polishing wheel to this type of hinge polished the blade and a short distance around the curve, the balance of the curve being finished by hand. The fixture illustrated was devised to eliminate the hand operation. The fixture carrying the work is an angle plate with a shouldered pin upon which the hinge is hung. A guide forces the hinge against the shoulder

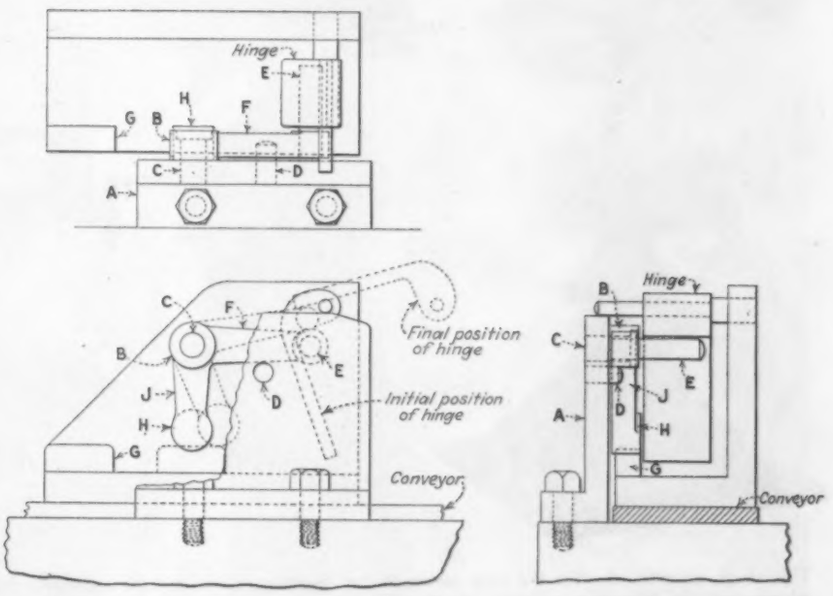
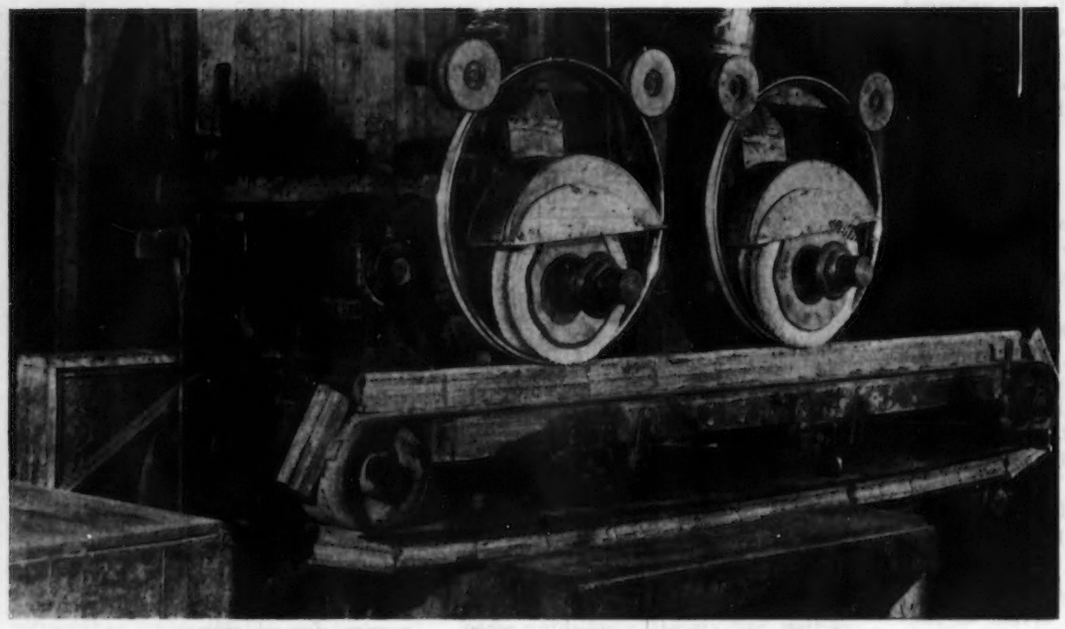


Fig. 13



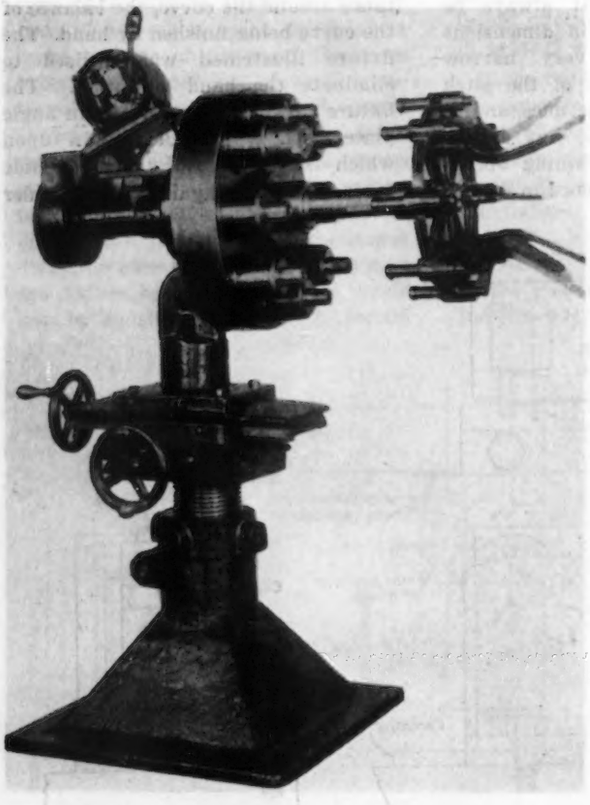
For polishing the inner surfaces of wheel rims an ingenious fixture was devised in which the rims were held against the polishing wheels by means of an endless belt with segments having an upper contour to match the outer concave section of the rims. Movement of this supporting belt causes the rims to rotate, thus bringing the full inner surface past the polishing wheel.

Courtesy Divine Brothers Co.

before it comes in contact with the polishing wheel, so that it is always located in the fixture in the same relative position as regards the wheel. Opposite each polishing wheel is an attachment that causes the hinge first to rotate about the pin on the moving fixture and then holds it at an angle with the horizontal to permit the wheel to polish the blade. This fixture consists of the angle plate *A*, on the inner face of which is suspended a bell-crank *B* which can rotate freely about the pin *C*. The stop pin *D* limits its downward movement and holds the pin *E* which is carried by the horizontal arm *F* of the bell-crank in a fixed position until it is moved upward by the cam block *G* coming in contact with the boss *H* on the vertical arm *J* of the bell-crank.

Polishing Hinges

The action of the fixture is as follows. The hinge is carried underneath the polishing wheel by the fixture attached to the conveyor of the



This chuck assembly revolves the wire spokes for automobile wheels past the face of a polishing wheel and at the same time revolves each spoke about its own axis.

An expanding cone on a revolving spindle is used for polishing outer surfaces of automobile headlights. Courtesy Acme Mfg. Co.

One of the longest straight-line polishing machines is here shown being used for automobile bumper work. The bumpers are fed by means of a belt successively under 14 polishing wheels. Courtesy Divine Brothers Co.

polishing machine. The angle plate *A* is so positioned that the blade of the hinge comes in contact with pin *E* at the instant that the polishing wheel strikes the edge at the heel of the hinge. As the conveyor carries the hinge forward under the wheel, pin *E* causes it to rotate around the hinge pin. This rotative action about the hinge will cause the polishing wheel to traverse perhaps one-half of the curved surface of the hinge. With pin *E* in its original position, the angle of the hinge would be such, the conveyor continuing to move it forward, that the polishing wheel would no longer contact the hinge and it is necessary to vary the angle of the hinge from the horizontal. At this point, the forward movement of the conveyor has brought the cam block *G* on the hinge fixture against the boss *H* on the bell-crank. Its continuing forward movement causes the bell-crank to turn, lifting pin *E* until it attains its maximum desired height, at which it is held by the boss *H* riding on top of the cam block until the polishing wheel has traversed the blade as far along its length as it is desired to polish. The boss *H* then rides down the rear end of the cam block, lowering the bell-crank against the stop pin *D* without shock and returning the hinge to its original vertical position ready for contact with the next wheel of the straight-line machine where a similar operating fixture causes it to repeat the cycle. The polishing wheel, being floating, rises and falls with the variation in height of the surface with which it is in contact and covers the entire surface of the hinge from the heel to the end of the blade if desired.

▲▲▲

HAND chainmaking has been a matter of skill in the Moore family for three generations. The home factory is at Cradley, Staffordshire. The young lady at the bellows is probably the next apprentice in line.

▼▼▼

Cutting Oils and the Fundamental Characteristics in Their Selection

By W. D. HUFFMAN
Chevrolet Gear and Axle Plant

Collaborators:
C. B. Harding
Sun Oil Co.
W. H. Oldacre
D. A. Stuart & Co., Ltd.

WITH the introduction of harder, tougher metals and the design and construction of automatic high speed cutting and grinding machinery, the problem of providing suitable cutting oils has reached a point where exact and scientific knowledge of the nature, use and application of these cutting oils is an absolute necessity.

Aside from tool and machine design, little is found in technical literature of really scientific value concerning ways of maintaining tool life, conserving power and machinery, and facilitating operations. Certainly the selection and application of cutting oils is of great importance and the study of this subject should be well worthy of any time and effort required.

Too often experience and shop tradition are the sole guides in the selection of a given cutting fluid. The subject is not difficult and it certainly seems of paramount importance that the knowledge and experience acquired should be correlated and some standard practice adopted. A great deal has been accomplished already along this line by two unbiased and competent observers, Geschelin and Boston; but it is time that their work should be supported and the proprietary tendencies removed from the subject.

Purposes

There is popularly believed to be two general reasons for the use of cutting oils. They are coolants and lubricants. As lubricants, they lubricate the area between the tool and the chip, although one may wonder sometimes what is meant by lubrication under pressures of 100,000 lb. which some observers maintain is reached. Nevertheless we know that they are effective and are tool and power preservers. Aside from the above functions, they are useful in washing away the accumulated chips, giving a bright and smooth finish and acting as rust preventives. These latter purposes in all probability will be incidentally accomplished in the selection of a proper oil for one of the two general reasons.

Types of Cutting Oils

We have two general types of oils, the so-termed soluble or emulsifiable oil and the straight cutting oil. The soluble oils mix or emulsify in all proportions in water; they are primary coolants but also have some lubricating action. They generally, if properly made, are good corrosion preventives. Many times their emulsions are used solely as corrosion preventives. Because of their low cost, it would seem advisable that their use should be encouraged whenever possible, and it is quite certain that in many operations, where now more expensive oils are used, they could be advantageously substituted. There are two types of soluble oils, those which are principally or entirely of mineral oil origin and those which contain an appreciable amount of saponifiable materials or soaps. Either may make stable or effective emulsions, but the former apparently are more stable and resistant to unfavorable conditions.

Non-Emulsifying Cutting Oils

The straight cutting oils offer a greater range of composition and likewise a greater field for individual preference. They usually contain one or all of the following constituents: mineral oil, saponifiable oil, and some non-metallic element, such as sulphur, which may be reasonably supposed to have some extreme pressure lubricating properties. Now mineral oils have never been considered all-purpose cutting oils, but many of us can remember when lard oil was the basis on which all cutting oils were evaluated and it was only the idea of the cost that was capable of diverting preference to other types. At present we have treated mineral oils without any saponifiable matter in them, taking the place of the former types and giving as good, if not better, performance. Under given conditions we know that mineral oil with addition of saponifiable matter will satisfactorily perform in a certain operation. We also know that a sulphurized mineral oil will perform the same operation with equal satisfaction. Now the problem involved is, just what is that characteristic inherent in each oil which gives the satisfactory performance, and in what amount does each of the selected ingredients supply that characteristic? Is it an oiliness that the saponifiable matter supplies, or is it extreme pressure lubricating properties that both the sulphur and saponifiable matter give? (Unquestionably, we will always have the problem of pressure and temperature with us in metal cutting.) If the former, certainly that could be obtained in a proper selection of mineral oil; if the latter, surely less expensive oils can be supplied. Naturally, this is a plea for reasonably standard specifications for straight cutting fluids.

In an attempt to reach some degree of standardization, there would be no discouragement of progress, for a competitive market would always stand as a safeguard; but a great gain might be accomplished in the dissemination of knowledge about the constitution and the applications of cutting oils. It is possible with the present knowledge of the chemistry of cutting fluids and engineering in cutting operations to greatly simplify the field of application and uses of this material. Frequently in large shops the selection of the cutting fluid is left to the decision of the person in charge of a certain operation At times it is not at all impossible to

find five or six different types from as many different sources, their selection being determined by such whimsical notions as odor, color, and apparent viscosity. Usually, chemical analysis and investigation reveal no justification for such varied selections. There may be a perfectly good oil purchased for general use, say, in tank storage, and at a price that would indicate its application wherever possible. The chances are that a certain mixture formed with this oil and light paraffine would do the job and save considerable expense. Assuredly, this is a condition that is hardly justifiable in the light of modern plant management. It is evident that a classification of cutting oils, together with an organized outline of their applications, would be of inestimable value in simplifying plant operation. Oil engineers recognize this fact and the more reputable companies supplying the material would welcome the approach, I believe, of a more rational simplification of the market.

Laboratory Control

Wherever possible it should be arranged that the laboratory should cooperate in the selection and inspection of cutting oils. An examination of incoming shipments will insure against lack of uniformity and substitution of products. Especially with soluble oils which do not possess the stability that the other types do, is laboratory examination most valuable. An incipient tendency to separate, or a lack of satisfactory emulsibility, can easily be detected by the laboratory control, and a great deal of argument and expense avoided. Furthermore, the emulsion in use can be daily examined and knowledge of its condition obtained with only a few minutes of any one's time. Might it not also be advisable that each shop have some technical person to whom the cutting oil manufacturers can impart their information, experience and data? The lubricating engineer seldom finds the man with whom he contacts in the shop sufficiently schooled in petroleum technology to discuss the important phases of cutting oil manufacture.

Laboratory investigation usually parallels the stressed characteristics of the specification. The specifications are usually formed from certain conventional ideas as to what are necessary valuable qualities of oils. These qualities may or may not be determined in the successful use of the lubricant. Soluble oils sometimes are difficult to analyze and can be torn apart only by a most skillful analysis, and then it is questionable how important the analysis would be. Usually, all that one desires to know is its emulsibility, its rust preventive properties and its tendency to separate. Then what would ordinarily be necessary would be to make a small amount of the emulsion with the oil and the water and examine after 24 or 48 hr. The thing of greatest importance is that it shall emulsify and not separate.

With non-emulsifiable cutting oils it is customary to evaluate the oil from the following: (1) Specific Gravity, (2) Viscosity, (3) Flash, (4) Fire, (5) Free Acid, (6) Saponifiable Matter, (7) Sulphur.

At one time the properties as determined by this outline were considered of great importance and frequently rejections of shipments resulted from even a slight variation from the specification set for a given material. Today consumers of cutting fluids in general are taking a different attitude toward the significance of these properties. They may, as a group, be of value in making known to the laboratory man the history and nature of the material, but, unless laboratory tests are made in conjunction with production tests, some false conclusions may result.

The specific gravity, flashing point, firing point and probably even viscosity are characteristics that are on debatable ground when it comes to making a proper evaluation of cutting fluid.

A given specified specific gravity may so limit a supplier that he may be forced to use certain raw materials, but it certainly can't in any way assure the buyer that he will receive any more useful product. The flashing and firing points, within certain obvious limitations, may be placed in the same group with specific gravity. How often does the consumer specify a certain flashing point and then have the production man blend with it a lighter oil, maybe even kerosene? The importance of viscosity as stated before is debatable. Opinions given by about 20 different observers show about 50 per cent disagreement. It has been stated, I believe, by Mr. Boston that he believed that viscosity is of value only in retaining within the oil those ingredients which are necessary for efficient cutting operations. Certainly all of us have seen work, where a heavy oil was considered absolutely necessary, done, and done well, with oil of only half the viscosity formerly used.

But when we come to the consideration of the introduction of saponifiable material, or sulphurized material into a mineral oil, we apparently have arrived at a vital point. These additions unquestionably give characteristics to the oil that it does not naturally contain. It has been intimated before that it might be possible to eliminate fatty material, but at present it is fairly well established that it aids in cooling and lubrication. Sulphurized oils have been in use for so long and their effectiveness so well known that it is unnecessary to discuss their merits. There is still some disagreement as to how much sulphur is needed, but that may be more or less determined by the amount of blending that is done in the shop or refinery.

Summarized, the fundamental characteristics governing the selection of cutting oils are as follows:

(1) **Soluble Cutting Oils**
  - (1) **Ability to emulsify.**
  - (2) **Tendency to remain stable without separation.**
  - (3) **Tendency to prevent corrosion and give satisfactory finish.**

(2) **Non-Emulsifiable Cutting Oils**
  - (1) **Quantity and nature of saponifiable material.**
  - (2) **Quantity of combined sulphur not in natural combination.**

From this summary, it would seem reasonably logical that if the supplier and consumer could meet on common grounds, it might remove a great deal of misunderstanding and superstition that now exist in the manufacture, purchase and use of these materials.

Another question involved in the selection of cutting oils, and one which usually comes up after a given oil has been in use for sometime, is that of infection. Rarely has one who has had anything to do with handling oils of any kind escaped this problem, and almost always there is involved a controversy. The companies marketing the oil have, as a whole, spent large sums of money and a great deal of time in the investigation of the

apparent spread at times of infection among workers who necessarily must come in intimate contact with petroleum lubricants. Frequently the consumer, who necessarily holds a certain responsibility as regards occupational disease toward those under his employ, is at a loss as to what to do at the appearance of these skin eruptions. It is no more than natural that he should look to the nearest probable cause of his trouble. Of course, the oil is invariably given the blame, a controversy started, and often the vendor must find another place to sell his product. Certainly it is not to be assumed that the oil is never a carrier of bacteria, but we may be reasonably certain in stating that actual bonafide cases wherein spread of infection may be blamed to oil are extremely seldom in occurrence. Obviously mineral oils are not media in which bacteria may satisfactorily propagate, and in the sulphurized or chlorided oils one would hardly suspect that they could exist at all. Likewise, in the soluble oils, a certain degree or rather excess of alkalinity should, we think, act in some respect as a disinfectant. It is not uncommon for one to receive a negative report, from the bacteriologist, even when skin eruptions are prevalent among those working about machines. It might be suggested that sanitary working conditions and cleanliness may often solve a problem of this nature and save a great deal of investigation and worry. Furthermore, it is understood by all that certain persons, more than others, probably due to unusual skin formation or bodily function, are susceptible to petroleum or alkaline irritations. Frequent change of clothing and careful personal hygiene often result in very gratifying results.

Applications

For the application of all types of cutting oils for mass production manufacturing, there remains a great deal of knowledge yet to be disseminated. Often there is not the proper discretionary judgment used in their selection and application. Of course, it is not easy to select a satisfactory oil for a given piece of work when all the difficulties to be encountered are not known. But with all this in view, the major problem is to find a type of oil that will supply the greatest number of needs or give the most successful operation on the greatest number of jobs. One approach to the solution of this problem may be found through the more general use of emulsions. There is a trend toward the greater use of emulsions and it is believed that when their possibilities are understood their use may be enlarged.

Because of the increase in manufacturing schedules, the machine tool manufacturers recently found themselves in the position of designing new equipment, which would remove metal more rapidly, though many times the floor space was limited in an already over-congested shop. As an example, one of the interesting developments has been the addition of surface broaching equipment either in horizontal or vertical plane. These machines, to a great extent, will replace the milling machines. It is interesting to note that when these machines first came into production, there was little or no information tabulated as regards the most advisable cutting oil to be used, and so for a long period of time various types of non-emulsifying cutting oils were used on this equipment. Cutting oils composed of sulphur, fats and a combination of both, with mineral oil, have been used for a considerable time with reasonable results. However, there always has been and probably always will be excessive consumption of oil on high production types of machines, the carry off usually is great and this factor naturally leads to exorbitant expense.

The question to be considered here is whether a lubricant of extreme pressure tendencies is desirable, or whether we find ourselves confronted with the condition of high temperatures. It is understood that considerable work is now being done on this problem and that emulsions have been found to be desirable on a great many jobs. It seems advisable that these data should be coordinated and tabulated so that they would be available to many consumers. An emulsion should be a desirable application on this type of equipment, in that it furnishes a principle of high refrigeration as well as some lubrication, and should there be high temperatures involved, the refrigeration should and will have a tendency to improve the life of the broach, which is a most important member of this machine. The metallurgist has contributed a great deal toward the solution of the problem of surface broaching. It has often happened that a cutting lubricant has been held in disfavor, when the problem was really one of machinability. Frequently, in encountering machining difficulties, the solution has been found in the metal specification or heat treatment and not in the selection of the proper cutting oil or emulsion.

Another interesting operation of mass production is that of grinding. It is probably one of the finest processes, for in this operation we reduce metal to such tolerances as 1/10 of 1000 of an inch. In view of experiences of the past, considerable investigation should be made with regard to grinding lubricant or emulsion. We usually find in an industry a lot of traditional opinions as to what constitutes a good grinding lubricant. It is not unusual to find some person requesting that the piece should have a high lustre, which may or may not be indicative of a good finish. Experience has probably proved that with the average type of grinding machine the tankage for holding the grinding lubricant is generally too small when consideration is given to the turbulences produced by the emulsion flowing to the abrasive member and back into the tank. Naturally, an emulsion should have some detergent or cleansing action, but the way to a finer finish and lustre might be made easier by placing somewhere in a system facilities for the removal of metal particles and other abrasives. Some users of grinding machines and grinding lubricants have already found it advantageous to have a separate central and return system where the emulsion flows through the grinding machine by gravity and is taken to a point remote from the machine where it remains without excitement for a period of time, thus giving the grindings and abrasives an opportunity to precipitate while the emulsion is not in excitement.

Many other practical applications of cutting oils might be discussed, but the factors, such as speed, pressure, temperature and machinability, must also come under consideration, for these factors must necessarily vary from shop to shop and job to job. Of course, it is of economic importance to the automobile manufacturer that the most serviceable oil be secured for the least expense, and a change to a maximum use of emulsions will, as was stated before, be in step in this direction. This probably can be done, but the consumer must first be enlightened. It has been suggested that a committee (similar to committees now operating on fuels and lubricants) could be formed for the purpose of investigation of the cutting oil problem. This committee, with meetings, if only once a year, might do a great deal toward the elimination of the confusion that now exists.

Wheeling Steel Corpn., Wheeling, W. Va., had net loss in the third quarter of $930,788, compared with a profit of $263,335 in the corresponding 1933 quarter. In the first nine months of 1934 the company reported a profit of $145,390 as against a loss of $56,940 in the first three quarters of last year.

Cylinder Blocks Broached Rapidly On Special Hydraulic Machine

IN cooperation with the Sterling-French Machinery Co., the Colonial Broach Co., Detroit, has developed and built the special horizontal broaching machine pictured on page 40, the main feature of which is that the broach is handled automatically, so that it is required of the operator that he load and unload work only.

Of heavy welded steel construction, the machine is designed to operate at high broach speed without chatter. The angularity of the base and slide tends to shed cuttings away from the broach and fixture, both of which are covered and protected. The base has four compartments, for the motors, for hydraulic equipment, large-capacity oil tank to insure a cool running circuit, and coolant and chip compartment respectively. Lubrication is by a forced-feed system arranged so that all reciprocating parts of the machine receive a measured amount of oil after each machine cycle. Coolant is delivered only when the broach is cutting; during the remainder of the machine cycle it by-passes back to the coolant tank. Broaching pressure gage is provided and hand lever gives emergency control.

Cutting speed of the broach ram is 540 in. per min. and rapid return is at 720 in. per min. The machine illustrated is tooled to aline-broach three camshaft holes in a cylinder block. The cylinder fixture is set at conveyor height and the operator slides the block over diamond-shaped plate serrations, for cleaning, as he loads the fixture. Within the fixture the block is positioned against two locating stops for temporary centering to facilitate final centering by locating plungers which are brought into place by the action of the same lever which controls the machine cycle. This single lever design is to insure block alinement with broach and as this same lever throws in the hydraulic circuit, it serves as a safeguard against premature starting. At the completion of the broaching stroke the block is pushed to the conveyor loading station in front of the machine by the action of an auxiliary oil cylinder; the broach then returns to its starting position.

New Bearing Uses Cork as Silencer

TYPICAL Fafnir design features a new, wide inner-ring type bearing with self-locking collar by the Fafnir Bearing Co., Hartford, Conn., and shown on page 40.

A cork pad which has been subjected to treatment said to prevent the loosening of particles, fits into the housing and around the bearing member and is used to gain silence in operation and to serve as a seal against both lubricant leakage and dirt entrance. The bearing is of deep groove, large ball design, affording thrust as well as radial high-load capacity, and is prelubricated in assembly for a year's use; tube provision is made for relubrication.

Improved Plastic Molding Press

PLASTIC molding presses, pictured on page 40, manufactured by the Lake Erie Engineering Corpn., Buffalo, now embody hydraulic operation for mechanical knockouts and strippers in order that the equipment may meet the hard duty requirements of modern methods. The moving platen is provided with adjustable bronze column bushings for maintaining parallel alinement of the moving mold with the stationary mold for assurance of consistent duplication of molded product and extended mold life.

Platen design and construction is said to bear a direct relation to claimed superiority in freedom from deflection which freedom, it is said, results in a minimum of product rejections.

High-Speed Milling Head For Boring Machines

EX-CELL-O AIRCRAFT & TOOL CORPN., Detroit, has brought out the high-speed milling head, pictured on page 41, for use on horizontal boring and milling machines. The unit provides a high range of speed for smaller sizes of end mills and drills for such use as milling small pockets and keyways and drilling small holes in large castings.

The driving shank of the head is furnished with a No. 5 Morse taper for use in all boring mills and milling machine spindles. The spindle in the high-speed head is furnished with a No. 4 Morse taper, a size suitable for end mills, drills, chucks, etc.

The step-up ratio of the head is 4 to 1 over the spindle speed of the machine. The unit is designed for a top speed of 1500 r.p.m. on the high-speed milling spindle, which is mounted in precision tapered roller bearings and has a maximum capacity of 1-in. diameter end mills and 1-in. diameter drills in steel. The body of the milling head and the driving shank are of one-piece construction, providing accuracy and rigidity in end thrust drilling and side and end thrust milling. The planet idler gears are mounted on hardened double anchored pins by means of roller bearings. Light transmission grease is used to provide lubrication for all bearings and gears.

A boss on the outside diameter of the milling head supports a torque bar which engages a machine bar parallel to the axis of the machine spindle.

A knockout pin for drifting end mills and other tools from the high-speed spindle extends through the driving shank, permitting removal with head unit in position.

Stub Lathes Designed For Compact Tooling

USE of cemented carbides and other modern cutting materials has been provided for in the design of new Sundstrand stub lathes pictured on page 40, and manufactured by the Sunstrand Machine Tool Co., Rockford, Ill.

The 6-in. stub lathe is built in semi-automatic and automatic types, three models of each.

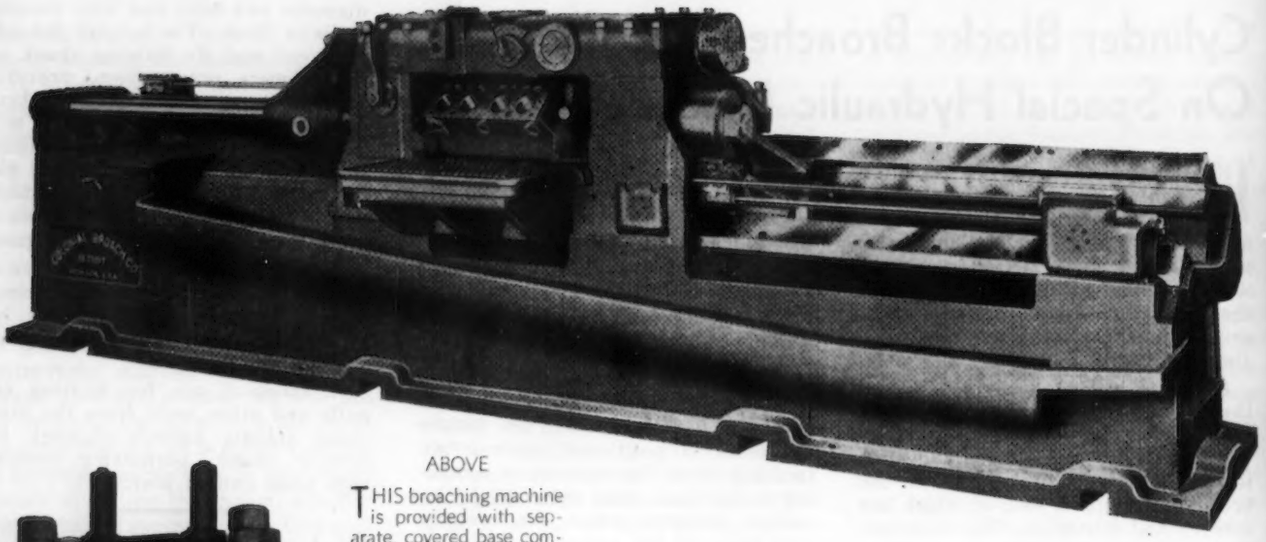
The box-section headstock is cast integral with the bed and is so designed that its cover forms a convenient operator's tool tray. Adjustable control, which stops the spindle before completion of rapid return, is provided.

Tail center is ball bearing; tail spindle clamp has quick-acting throw and the tailstock lever action has like merit. The tailstock has broad support, with two T-slots, narrow guide and adjustable gibs.

Patents are pending on new mechanisms covering accurate automatic engagement and disengagement of feeds on the semi-automatic type and complete control on the automatic machine. The rear slides are made in light and heavy-duty types. Coolant is provided from the pan at low pressure; the pump starts and stops automatically with the spindle.

Motor for spindle drive is accessibly mounted in the base; a separate motor drives the traverses on the automatic types of machine.

A number of interesting modifications from standard specifications can be cited, among which are a two-tool slide for each front and rear carriage. On the front carriage, one slide is used in straight hub turning, the other for turning a back angle. On the rear carriage one slide is used feeding in for facing, the other feeding straight in and then at an angle for turning the faces of blanks. Another modification, as shown on page 40, is an angular arrangement of four slides, set up for forming operations on steering worm blanks.

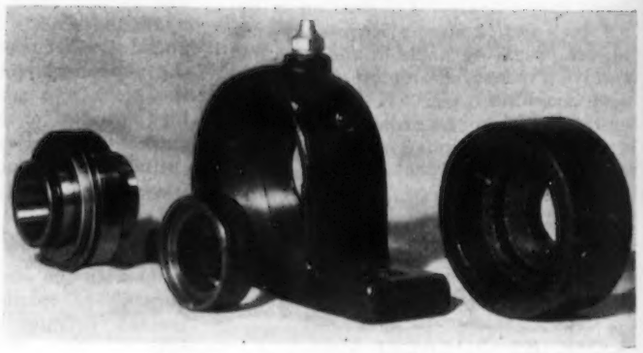


ABOVE

THIS broaching machine is provided with separate, covered base compartments for housing operating units, oil, coolant and cuttings, and is so designed that its operation, loading and unloading are directly related to conveyor setup. A number of details are covered on page 39.

AT LEFT

USE of hydraulic power for the operation of mechanical knockouts and strippers has been adopted by a manufacturer of plastic molding presses whose improved product is described on page 39.



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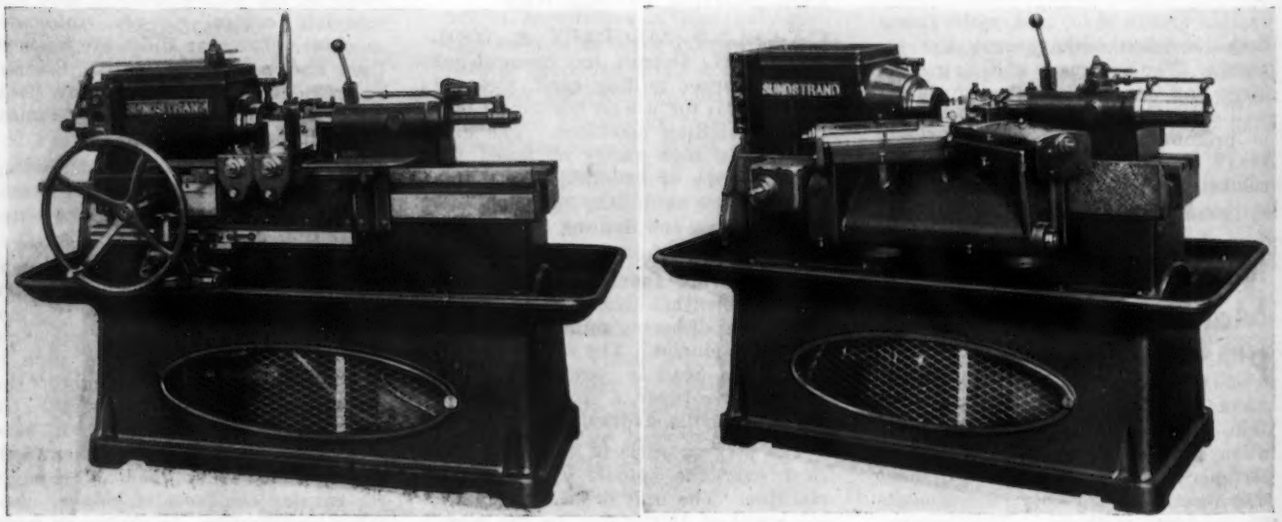
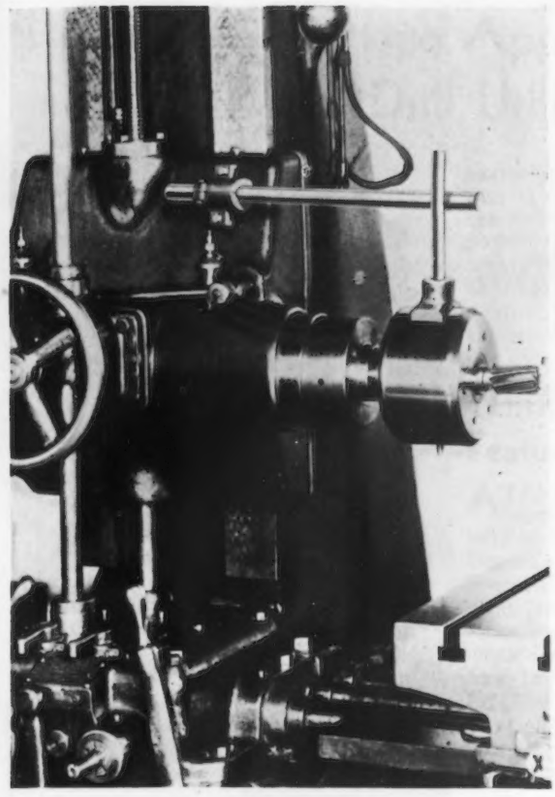
BEARINGS designed for the use of cork to obtain quietness, and long use without lubrication attention as well as for carrying thrust and radial loads are noted on page 39.

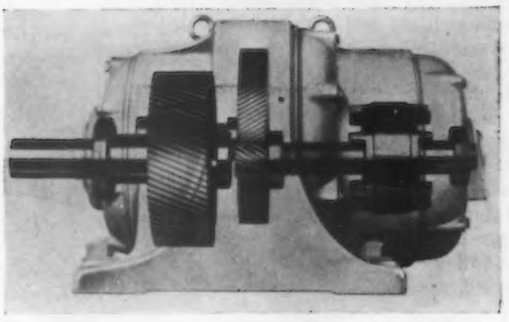


THE utility of the stub lathe is said to be largely increased through applications of specially designed tool-holding elements which approximate the turret lathe or the automatic in work possibilities. See page 39.



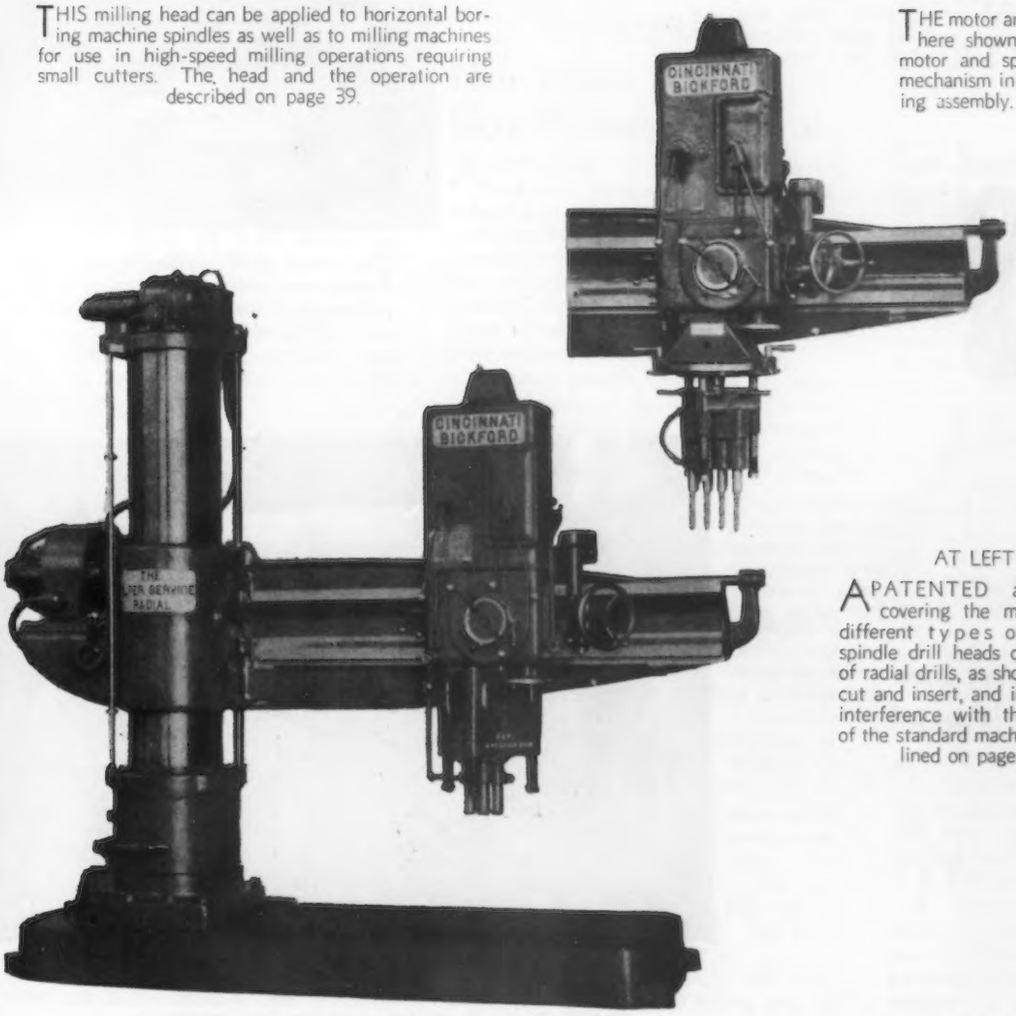
ABOVE

THIS milling head can be applied to horizontal boring machine spindles as well as to milling machines for use in high-speed milling operations requiring small cutters. The head and the operation are described on page 39.



ABOVE

THE motor and reducer unit here shown combines motor and speed reduction mechanism in a single housing assembly. See page 43.

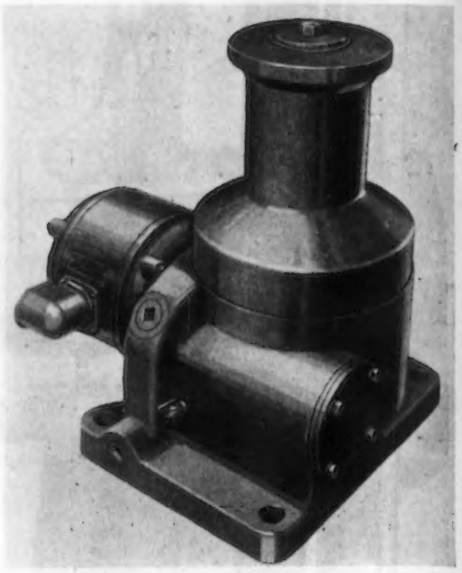


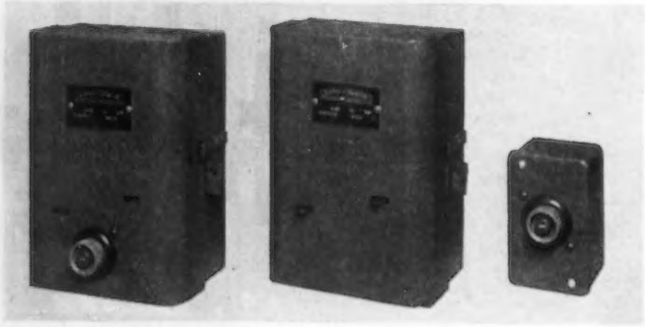
AT LEFT

A PATENTED application, covering the mounting of different types of multiple-spindle drill heads on the arm of radial drills, as shown by this cut and insert, and involving no interference with the purposes of the standard machine, is outlined on page 43.

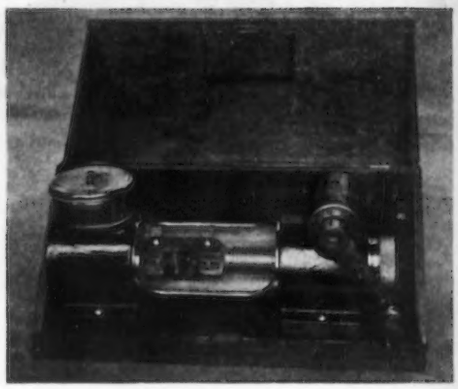
AT RIGHT

COMPACTNESS is an outstanding feature of this motor-driven car spotter which is referred to on page 43.

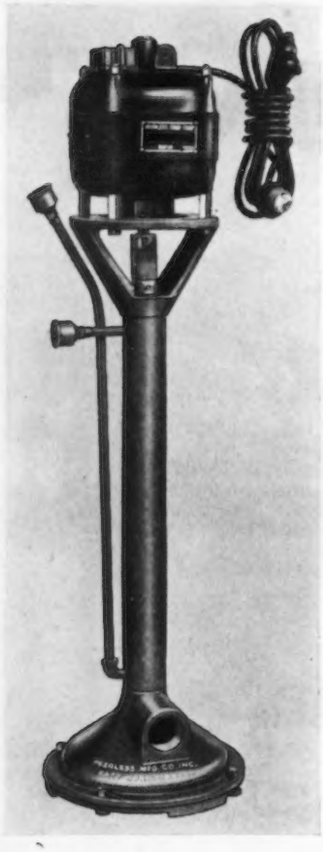




NEW, protected control, motor starters, shown here and described on page 43, are built in three types for different horsepower ranges. Long contact life is featured.

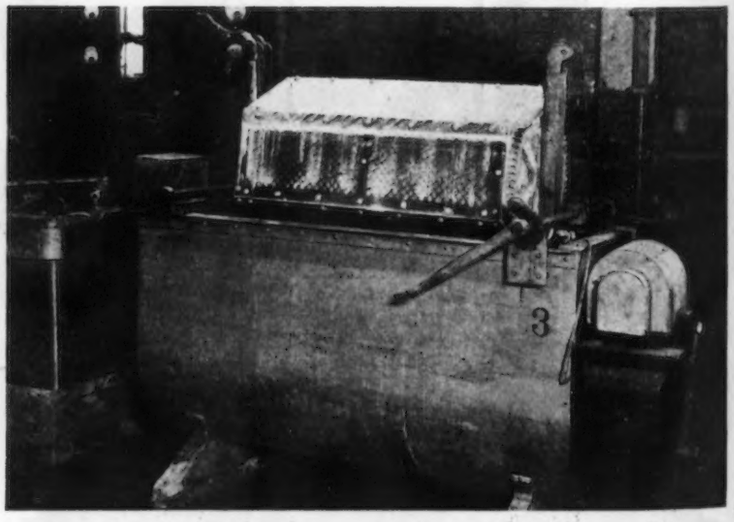


THE weight of this incased tensile tester unit is said to largely increase its utility without sacrificing its availability for laboratory use. See page 43.



AT LEFT

INDUSTRIAL use of this sump pump is said to be free from clogging troubles caused by the mixing of floor refuse with the water which is being removed. A description is given on page 43.



THIS micarta barrel has seen five years of severe service in cadmium plating solutions at the Westinghouse Electric & Mfg. Co.'s East Pittsburgh works. The ends are 1¼-in. and the panels are ¼-in. micarta duck board.

Patented Drill Head Application Increases Radial Drill Utility

A NEW bracket construction for mounting and supporting multiple-spindle drill heads on radial drills has been developed and patented by the Cincinnati Bickford Tool Co., Cincinnati.

This bracket, securely bolted to the head yet easily removed, is arranged to counterbalance the weight of the drill head unit. The counterbalancing causes quick return of the head from the work, while the bracket unit is said to supply the rigidity which is lacking when some method of clamping around the spindle-sleeve is used as a means for drill head unit support.

Fig. 1, on page 41, shows a 6-in. Cincinnati Bickford super-service radial drill equipped with a fixed-center, ball-bearing drill head carrying three 1¼-in. drills, spaced on 2¾-in. centers, each with vertical spindle adjustment. The insert view on page 41 shows a swivel-type mounting which permits a complete circle rotary adjustment of the drill head. This particular ball-bearing drill head carries four 1-in. drills spaced on 3 1/16-in. centers. Cutting lubricant is supplied to each drill by separate nozzles. The machine may be converted to a standard 7-in. super-service radial in the few minutes required to remove the drill head and patented mounting bracket.

The drill heads shown in these photographs have the spindles in line, but other types of drill heads are equally applicable. Bolt circle drilling of several diameters can also be handled with an adjustable center distance drill head. The use of a multiple spindle drill head causes no sacrifice in drilling efficiency or in the ease of handling.

Sump Pump Provides For Full Capacity Flow

THE self-priming centrifugal pump with open impeller, pictured on page 42, is manufactured by the Peerless Mfg. Co., East Norwalk, Conn. It is offered for emergency removal of seepage, tide or other waters and is designed to eliminate flow interference from sweepings-refuse, such as is common to industrial floors. The floor or cellar model is 48 in. in overall height, and weighs 55 lb. ready to plug into an electric light socket for the operation of its ¼-hp. motor. It is said that this model will pump out any collected water to within ⅛ in. of a level floor at the rate of 40 gal. per min., up to an 18-ft. maximum head, at 5 to 10 ft. The pump is easily portable for construction, building, ditch or emergency work, or it can be equipped with pit and drainage impeller base for installations or use where conditions of water hazard can be predetermined and provided against through pit or low area construction.

Tensile Tester Features Portability

A TENSILE testing machine of 4000-lb. capacity yet weighing only 25 lb. has been introduced by the Detroit Testing Machine Co., 5137 Trumbull Avenue, Detroit. The equipment is said to combine accuracy and other essential features of laboratory machines with light weight and to have the advantage of portable utility for field work which permits demonstration-checking in actual testing of specimens. For laboratory purposes it is attached to a bench or table top.

The equipment is shown on page 42, packed in a convenient carrying case.

New Motor Starters Give Protected Control

A NEW line of automatic motor starters designed to prevent accidental starting and to make motor capacity available without danger of burning out, is announced by the Lincoln Electric Co., Cleveland. This starter, shown on page 42, is of the across-the-line type and is said to meet underwriter's requirements.

Control design prevents unintentional closing of the starting current. The red stop button extends around and beyond the green start button in such a manner that impact or contact against the control can move only the stop button. The motor can be restarted only by pressing the recessed start button with the fingertip.

Full advantage of motor capacity is permitted by an inverse time limit protection which allows carrying a small overload a long time or very heavy load a short time. Immediate motor starting upon resumption of current is insured by low voltage release with two-wire control.

The new starters are furnished in three types for different horsepowers and 110, 220, 440 and 550 volts. The XLA starter is for 3 and 5-hp. motors, 110 volts; also 3, 5, 7½ and 10 hp., 220, 440 and 550 volts. The XLB starter is for 7½ and 10 hp., 110 volts; 15, 20, 25 and 30 hp., 220 volts; 15, 20 and 25 hp., 440 volts; and 15 and 20 hp., 550 volts. The XLBB is for 30 hp., 440 volts; and 25 and 30 hp., 550 volts.

Mechanical moving parts are reinforced and protected against rust by cadmium plating. Cushion action is provided for the relay armature to better wear conditions.

In the XLA starter, surface creepage between lines is eliminated by a one-piece barrier made of an asbestos compound properly impregnated against moisture absorption and for arcing prevention.

Parts of the starter are readily accessible; moving contacts can be removed without tools; stationary contacts can be removed by use of a screwdriver.

Easy installation and replacement without disturbing the rigid conduit is provided as follows: A single screw holds the switch panel to the back of the case. Rigid conduit can be led into the case after it is attached to the wall. Space is saved by having the switch drop downward.

Long contact life by a wiping action is said to prevent pitting and, in the XLB size, cadmium plated steel shields are said to provide an instantaneous thermal and magnetic quench for the arcs.

The starter case permits wiring of more than one control station. Overload can be reset on the outside of the case, thus permitting case locking to prevent tampering with the switch mechanism.

Car Spotter Equipped With Motorized Capstan

LINK BELT CO., 910 South Michigan Avenue, Chicago, announces the redesign of its vertical-capstan electric car spotter, in to a motorized unit. The motor is bolted to the side of the housing. The motor shaft extends in to a substantial one piece of housing containing a helical gear reduction at motor and a worm-gear set; all gears run in oil.

The motor is of high-torque fully inclosed type and, with motor pinion, can be removed as a unit. The equipment is built in two sizes, a rope pull of 5000 lb., and the larger size, a rope pull of 10,000 lb. See page 42.

Unit Motor-Reducer Has Integral Base Supports

AN electric motor assembly featuring geared reduction and requiring no greater space allotment for the unit than that ordinarily given to a driving motor is presented by the U. S. Electrical Mfg. Co., Los Angeles.

A phantom view of this unit is shown on page 41. Within the motor housing there is a transmission base, an integral part of the pyramid base, supporting torque strains.

THE NEWS OF THE WEEK

British Iron and Steel Shipments In October Best Since 1921

LONDON, ENGLAND, Nov. 7 (*By Cable*).—October shipments of iron and steel were the highest since April, 1921.

Home pig iron demand is brisk but limited to small parcels for prompt shipment, as consumers bought heavily for months ahead. Stocks are decreasing and higher production is probable. Export inquiry is better and business is expected from Germany in view of the Anglo-German agreement.

Steel demand is improving. Continental competition on semi-finished less pronounced and British makers are well booked. Finished steel makers are receiving more orders from the building, engineering and shipbuilding trades. Good export sales are reported, particularly to South Africa, India and Argentina.

Tin plate sales are better and new business is being booked for delivery until the middle of 1935 with steady deliveries on old contracts. Exports are generally quiet, but good business is being done with Continental buyers.

Continental iron and steel demand is quiet, partly because of too high fixation of sterling coefficient. Japan is buying and better business is coming from South America, mainly in billets.

Hungary has left the International Raw Steel Cartel owing to split in Central European iron and steel group. No progress is being made with thin sheet cartel, and its conclusion is believed unlikely before English attitude toward International Raw Steel Cartel is disclosed.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9	
Billets, open-hrth.	£5 10s.	to £5 15s.
Tin plate, per base box	18s. 2d.	
Steel bars, open-hearth	£7 17½s.	
Beams, open-hrth.	£7 7½s.	
Channels, open-hearth	£7 12½s.	
Angles, open-hearth	£7 7½s.	
Black sheets, No. 24 gage	£9 5s.	
Galvanized sheets, No. 24 gage	£11 5s.	

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	£2 7s.		
Wire rods, No. 5 B.W.G.	£4 10s.		
Steel bars, merchant	£3 5s.		
Sheet bars	£2 8s.		
Plates, ¼ in. and up	£4		
Plates, 3/16 in. and 5 mm	£4 2s.	6d.	
Sheets, ⅛ in.	£4 7s.	6d.	
Beams, Thomas	£3 2s.	6d.	
Angles (Basic)	£3 2s.	6d.	
Hoops and strip base	£4 2s.	6d.	
Wire, plain, No. 8	£5 7s.	6d.	
Wire nails	£5 15s.		
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.		

Further Price Reductions Filed With Institute

FOLLOWING close on the heels of the recent reduction of $6 a ton on spring wire, cuts of $6 a ton on high-carbon spoke wire and $8 a ton on high-carbon basic wire have been announced. The new prices, which become effective Nov. 11, are $2.90 a 100 lb., Pittsburgh or Cleveland, $2.95, Chicago, and $3.00, Worcester, on spoke wire, and $3.40, Cleveland, $3.45, Chicago, and $3.50, Worcester, on basic wire.

New prices on seamless round automatic tubing for tractor pin bushing tubes and for front axle tubes have been announced, effective Nov. 1 to 4 on the former and Nov. 10 on the latter. The prices cover smaller ranges of sizes than formerly—1⅝ to 3½ in. O.D. and 1⅝ to 1⅜ in. O.D., as against ¾ in. to 3½ in., for tractor pin bushing tubes—and on the larger sizes represent a reduction. On the tractor pin bushing tubes, with wall thicknesses of ¼ to 9/16 in. inclusive, the new prices are $4.75 per 100 lb. for cold drawn and $4.275 for hot-finished. On tubing under 1⅝ to 1⅜ in. the prices are $5.50 for cold drawn and $4.95 for hot-finished. These quotations apply to Milwaukee, Pittsburgh, Shelby (Ohio), and Canton (Ohio), except that at Canton there is no price on hot-finished in the lower size range.

The new prices on cold-drawn seamless round front axle tubes, S.A.E. No. 4100 series, 1½ to 3 in. O.D., inclusive, with walls not lighter than 0.148 in., are $8.75 per 100 lb., Pittsburgh, Milwaukee, Ohio, Shelby and Canton.

Prices of $93 a net ton for carloads and $99 for less than carloads have been filed f.o.b. Gary, Nov. 5, on square and rectangular galvanized pipe. This is a new product. Previously only black pipe has been sold in square and rectangular shapes.

Producers of terne plate have filed a new price of $4.69 a single base box on manufacturing ternes, 4-lb. coating. A single base box consists of 100 lb. or 112 sheets, 14 in. x 80 in. Prices had heretofore been quoted on 6-lb. coated material. The new quotation is effective Nov. 10.

Youngstown Reports Third Quarter Loss

THE Youngstown Sheet & Tube Co. lost $1,257,371 during the third quarter, after all charges, including depreciation and depletion, as compared with a profit of $1,012,207 in the second quarter and a loss of $1,177,576 for the third quarter of 1933. Total loss for the first nine months of this year was $1,668,633 as compared with a loss in the first nine months of 1933 of $6,858,540. At the close of business, September, 1934, the company had cash and investments in Government and other marketable securities to the amount of $13,042,339, and the ratio of current assets to current liabilities was 11.10 to one.

Iron and Steel Exports Hit Post-War High

Exports of Iron and Steel from the United States

(In Gross Tons)

	September		Nine Months Ended September	
	1934	1933	1934	1933
Pig iron	379	152	2,617	1,855
Ferromanganese	....	16	44	27
Scrap	225,212	40,536	1,275,414	504,653
Pig iron, ferroalloys and scrap	*225,591*	*40,704*	*1,278,075*	*506,535*
Ingots, blooms, billets, sheet bars	430	448	9,211	2,051
Skelp	1,140	4,821	60,360	14,235
Wire rods	1,293	428	19,081	8,960
Semi-finished steel	*2,863*	*5,697*	*88,652*	*25,246*
Steel bars	3,917	1,559	30,791	14,798
Alloy steel bars	228	150	2,189	1,024
Iron bars	70	50	786	397
Plates, iron and steel	4,555	2,461	29,705	7,203
Sheets, galvanized steel	6,500	12,241	49,215	33,258
Sheets, galvanized iron	99	39	1,088	662
Sheets, black steel	6,078	4,638	65,007	22,267
Sheets, black iron	284	235	3,536	1,566
Hoops, bands, strip steel	1,079	1,729	22,083	14,983
Tin plate, terne plate	17,752	7,490	140,076	45,172
Structural shapes, plain material	4,983	2,077	25,186	9,650
Structural material, fabricated	2,782	1,723	14,752	10,475
Tanks, steel	183	287	4,733	1,833
Steel rails	2,826	6,277	56,057	17,506
Rail fastenings, switches, spikes, etc	1,207	686	14,033	3,559
Boiler tubes	1,085	543	5,954	3,011
Casing and oil line pipe	3,218	3,771	50,976	21,973
Pipe, black and galvanized, welded steel	3,728	3,765	33,515	22,909
Pipe, black and galvanized, welded iron	90	96	1,760	1,030
Plain wire	3,237	2,847	28,677	12,283
Barbed wire and woven wire fencing	2,779	3,283	28,899	20,569
Wire cloth and screening	164	70	779	514
Wire rope	219	135	2,064	1,350
Wire nails	875	1,050	10,253	7,320
Other nails and tacks	338	399	3,866	2,969
Other wire and manufactures	444	229	3,739	1,922
Bolts, nuts, rivets and washers, except track	450	327	3,780	2,328
Other finished steel	132	95	1,334	947
Rolled and finished steel	*69,302*	*58,252*	*634,833*	*283,478*
Cast iron pipe and fittings	1,563	2,674	11,939	9,076
Malleable iron screwed fittings	203	220	2,251	1,591
Carwheels and axles	779	288	4,409	3,013
Iron castings	354	591	5,571	2,414
Steel castings	284	21	1,690	602
Forgings	391	352	3,217	2,248
Castings and forgings	*3,574*	*4,146*	*29,077*	*18,944*
Total	301,330	108,799	2,030,637	834,203

Imports of Iron and Steel Products Into the United States

(In Gross Tons)

	September		Nine Months Ended September	
	1934	1933	1934	1933
Pig iron	12,290	19,745	99,091	119,365
Sponge iron	51	145	795	517
Ferromanganese and spiegeleisen*	1,985	8,408	23,411	39,775
Ferrochrome†	....	3	67	24
Ferrosilicon‡	41	309	638	419
Other ferroalloys§	....	....	46	102
Scrap	1,157	13,927	30,317	46,344
Pig iron, ferroalloys and scrap	*15,524*	*42,537*	*154,365*	*206,546*
Steel ingots, blooms, etc	333	126	1,321	618
Wire rods	339	693	8,582	9,685
Semi-finished steel	*672*	*819*	*9,903*	*10,303*
Concrete reinforcement bars	161	147	1,121	1,953
Hollow steel bars	150	108	662	682
Merchant steel bars	1,507	2,559	14,259	14,558
Iron slabs	....	....	1	1
Iron bars	67	16	687	312
Boiler and other plate	43	34	225	191
Sheets, skelp and saw plate	336	515	3,475	7,257
Tin plate	....	10	117	221
Structural shapes	1,877	3,161	16,277	21,161
Rails and rail fastenings	52	35	2,157	4,616
Welded pipe	86	1,035	1,302	3,554
Other pipe	109	366	2,265	1,388
Barbed wire	533	434	7,869	6,216
Round iron and steel wire	138	171	1,998	2,235
Flat wire and strip steel	178	143	1,258	832
Wire rope and strands	139	144	1,182	1,205
Other wire	34	108	622	1,301
Hoops and bands	1,477	2,461	13,246	16,023
Nails, tacks and staples	599	712	5,728	4,798
Bolts, nuts and rivets	8	3	194	182
Other finished steel	30	17	1,438	389
Rolled and finished steel	*7,524*	*12,179*	*76,083*	*89,075*
Cast iron pipe and fittings	....	....	40	724
Castings and forgings	127	171	1,188	962
Total	23,847	55,706	241,579	307,610

*Manganese content only.
†Chrome content only.
‡Silicon content only.
§Alloy content only.

EXPORTS of iron and steel products from the United States during September totalled 301,330 gross tons compared with 242,947 tons in August and 108,799 tons in September, 1933, according to the Iron and Steel Division, Department of Commerce. This was the highest total for any other month since the abnormal consumption of such products during the period of the World War.

Foreign shipments of iron and steel products during the nine months of the current year totalled 2,030,637 tons compared with 834,203 tons in the corresponding nine months of 1933.

Exports of scrap from the United States during September exceeded shipments for any previous month of record and totalled 225,212 tons against 155,542 tons in August and 40,536 tons in September, 1933.

Japan was the first-ranking market for scrap during the month, accounting for 161,401 tons of the total exported. Other important outlets for scrap during the month included Italy, Poland and Danzig, Rumania, Canada and China.

Imports of iron and steel products into the United States during September totalled 23,847 tons compared with 32,418 tons in August and 55,706 tons in September, 1933.

Sources of American Imports of Iron and Manganese Ores

(In Gross Tons)

	September		
	Iron Ore		Manganese Concentrates 35 Per Cent or Over
	1934	1933	1934
Canada	45	45	....
Cuba	....	22,000	....
Chile	44,400	96,608	....
Spain	....	....	....
Norway	9,291	....	....
Sweden	7,756	....	....
French Africa	....	....	....
Russia	7,550	17,240	2,463
India	....	....	....
Brazil	....	....	200
West Africa	....	....	1,878
Other countries	8,123	200	....
Total	77,165	136,093	4,541

United States Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	September		Nine Months Ended September	
	1934	1933	1934	1933
United Kingdom	250	....	500	5,140
British India	2,762	7,236	27,977	48,195
Germany	....	....	....	234
Netherlands	5,944	5,737	58,897	48,720
Canada	3,184	6,425	7,848	10,844
France	100	....	100	....
Belgium	....	....	50	....
Norway	....	100	2,046	702
Sweden	50	....	615	2,980
All others	....	347	1,058	2,584
Total	12,290	19,745	99,091	119,399

"Steel Room" Dedicated In Chicago Club

THE latest innovation in private dining rooms at the Union League Club, Chicago, is a "steel room," dedicated in name and decoration to Chicago's steel industry and to the large group of club members affiliated with that industry and its allied lines.

In the main this new room is decorated, in fact papered, with large photographic murals that cover the entire wall space down to the chair rail. These enlargements, made in severe black and white, show the most important steps in the process and use of steel. Open pit ore mines, ore docks, ore freighters, open-hearths, Bessemer converters, soaking pits, rolling units, steel bridges and skyscrapers in the course of erection, all meet the eye of the visitor. One wall is decorated with a panoramic night scene at a steel mill.

The chair rail is studded with rivet heads and the rail, baseboard and the wall between them are finished to resemble steel and give the impression of steel plate girders surrounding the room. The ceiling and dado are finished to give the appearance of polished sheet steel. Drapes are silvered and they drop to the floor to a steel gray carpet with a steel blue border. The furniture is of steel, the chairs being made of stainless steel tubing and upholstered in flame-colored leather.

The door to this room was presented by the United States Steel Corpn. Both the door and the frame are made of stainless steel. The inner side of the door is richly etched.

At the dedication George G. Thorp represented the Illinois Steel Co.; D. A. Merriman, the American Steel & Wire Co.; E. H. Heald, the American Bridge Co.; F. H. Johnson, the United States Steel Corpn.; E. L. Hartig, Joseph T. Ryerson & Son; F. R. Meyer, Jr., the Inland Steel Co., and R. H. Norton, the Acme Steel Co.

Ford of Canada to Build New Foundry

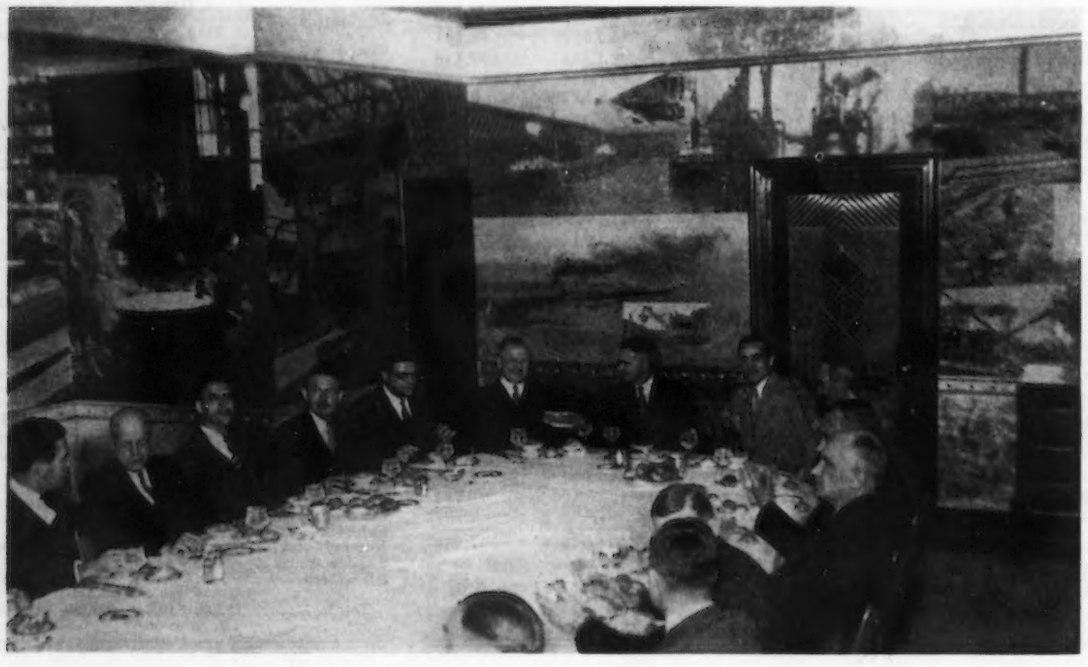
THE Ford Motor Co. of Canada, Ltd., East Windsor, Ont., will shortly begin construction of an electric furnace foundry which initially will be devoted to casting alloy steel crankshafts for Ford V-eight cars and trucks at the rate of 200 crankshafts per eight-hour shift. The new structure makes provision for later expansion by the addition of two furnaces as they are required. The foundry building will cost $160,000, equipment $245,000 and service facilities $20,000, making a total expenditure of $425,000.

The foundry will be laid out to permit progressive manufacture from the assembly of the materials to the finished crankshafts. Elevators will lift the sand for core molding to dryers and mixers which will deliver it to a core molding table ready for use. From this point the core molds will pass through a core oven and thence to a core handling and storage system. From the storage conveyor the core molds will pass to the casting conveyor, past the furnace for the casting process and on to the miscellaneous processes, including cleaning and heat treating to prepare the rough castings for the machine operations.

An electric furnace will supply 25 tons of molten cast alloy steel daily, with single charges averaging four tons. The electric power load of the furnace will approximate 2100 kw. Storage capacity will be provided for 225 tons of pig iron and scrap and 175 tons of sand for core molding.

The Ford cast crankshaft is made of high-carbon, high-copper, chrome-silicon alloy steel. The particular alloy used and the new foundry equipment and practices employed were developed by Ford not only to provide a new and better metal with maximum strength and toughness, in order to resist the loads imposed upon it, but also to reduce both the operations required and the cost of manufacture. The method of producing cast crankshafts at Ford's River Rouge plant was described in detail in THE IRON AGE of March 15, 1934.

Bureau of Reclamation, Denver, asks bids until Nov. 16 for miscellaneous steel for generator room crane runway catwalk (Specification 635-D); until Nov. 19 for one station service penstock (Specification 633-D); until Nov. 19 for four steel bridge spans, including pins, anchorages, base plates, anchor bolts, etc., cast steel shoe castings, rocker castings, toothed expansion castings and auxiliary equipment for intake towers (Specification 634-D), all for Boulder Dam power plant, Boulder Canyon project, California-Nevada.



PHOTOGRAPHIC murals in "Steel Room" at Union League Club, Chicago, depict important steps in the processes of making and using steel.

Foreign Trade Council Urges Export of Capital and Exchange Stabilization

IN a declaration unanimously adopted, the National Foreign Trade Council, in its twenty-first annual convention held in New York last week, advocated modification of the National Securities act to permit foreign loans and investments under proper safeguards and recommended the stabilization of the dollar with concurrent abandonment of further monetary experiments. The Council approved the President's plan for reciprocal trade agreements and asked for an adequate merchant marine. Curtailment of agricultural production was opposed and the Export-Import Bank was endorsed.

In calling for the stabilization of exchanges on a gold basis, the resolution stated that "depreciation of our currency cannot permanently assist exports and retard imports." It added, however, that exchange stabilization "is possible only after budgets have been balanced."

Holding that the export of capital is essential to further foreign trade, it expressed confidence that the Federal Securities act would be administered so as not to discourage foreign lending. It also urged that "additional measures be taken by the Departments of State and Commerce, and the Export-Import Banks, to provide for the return of blocked funds."

Regarding agriculture, the declaration recommended that Government payments be limited to that part of the crop which is domestically consumed, and that the surpluses be sold at world market prices. It voiced "its concern over the present conditions affecting our trade in the Pacific area" and its belief that "the future of our world trade is indissolubly bound to the maintenance of a full measure of reciprocal trade in that area.

Maintaining that the security of our commerce depends on an adequate American merchant marine, the resolution approved Government subsidies.

Emphasizes Practical Rather Than Theoretical Measures

In opening the convention, James A. Farrell, chairman of the National Foreign Trade Council, pointed out that the chief obstacles to the expansion of our foreign commerce are to be found in conditions abroad. He emphasized that practical rather than theoretical remedies for the conditions now current should be sought.

"We shall not solve these difficulties by retiring from the foreign field," he said, "but by going forward. Restoration of the world economic system depends on the elimination of existing artificial barriers to trade—depreciation of currencies, exchange restrictions, quotas, and other devices which retard the rate of recovery in all countries. Until the currencies of all countries are stabilized, our reciprocal trade agreements should make provision for tariff adjustment to meet exchange fluctuations. . . .

"What is most needed by the business man is freedom from uncertainty, due to frequent changes in monetary and tariff policies and in customs regulations. The most acceptable forms of trade relationships are those that afford reasonable opportunity for long-term undertakings."

Opposes Horizontal Reduction of Tariff

Indicating the necessity for seeking reciprocal trade agreements with other countries, George N. Peek, special adviser to the President on foreign trade, pointed out that there are now 180 special trade conventions between the chief commercial nations, the benefits of which are denied to the United States.

"There is a considerable school of thought," he stated, "represented principally by those lacking experience in practical business affairs, that still advances the old theory that if the United States would only remove barriers to trade we would automatically participate in the general improvement which would follow. I do not agree with such a conclusion, for only those concerns or those countries which are organized to take advantage of the opportunities which present themselves can expect to reap the benefits of a general improvement in conditions. If this were not so, we should not see around us now the varying degrees of prosperity in different companies in the same line of business."

Declaring that he believed the Government must take action in the case of countries exercising exchange controls against us, Mr. Peek said:

"I do not believe the full course of such action can be taken through our commercial banks or even through the Export-Import Bank, but I can conceive that if the Stabilization Fund, created to maintain the stability of our own exchange, should, under proper authority, handle all exchange at a proper charge, and with selected countries, a most far-reaching service would be rendered to sound American foreign trade."

Denies Export Surplus Must Be Wiped Out

George P. Auld, partner, Haskins & Sells, New York, assailed the view that our export surplus is inimical to an expansion of our foreign trade. He contended that the United States, like Great Britain of pre-war days, is a natural creditor, just as certain other nations are natural debtors, and that the excess of credit accumulated here inevitably tends to flow to countries suffering a dearth of credit.

"This country," he stated, "becomes potentially a creditor nation from the fact that our savings are not wholly taken up by demands of the home capital market. . . . Turning to the relatively undeveloped countries —the natural debtors for the time being—we find that they are producing less new capital than they need. It is clear that the surplus new capital of the natural creditors tends to spill over and flow to the natural debtors for employment. It does this in obedience to the law of supply and demand."

In comparing our present status with the pre-war position of Britain, he said, "What made England a creditor on international account was the overriding export of services. What has made us a creditor is the overriding export of commodities."

The surplus of every creditor country in history, he added, has always been moved by foreign lending and by no other means. Losses on our pre-depression foreign loans were not so great as on certain classes of our domestic investments. He derided the argument that opportunities for good foreign investments have declined. The process of industrializing still newer areas of the world, he stated, and of making improvements to meet new conditions in the old areas is unceasing. "The world has always moved forward, providing, generation by generation, more comforts and better living for the population at large."

China As a Potential Market

Charles Page Perin, Perin Engineering Co., New York, contended that, largely because of superior rail transportation, the Indian peasant, with fewer natural advantages, has attained a standard of living twice as high as that of the Chinese peasant. India has a railway system of 43,000 miles, as against only 7900 miles for China. The export of capital to China for railroad development is logically to be expected, in his opinion.

Various speakers emphasized the need for an adequate merchant marine. "No nation," declared Rear Admiral Yates Stirling, Jr., "can be considered prepared to conduct a war on the seas without an adequate merchant fleet from which to draw while not entirely crippling its foreign commerce. The navy and the merchant marine are interdependent and should be administered with that idea in mind. . . . Only the most scientifically planned and executed program in all the elements of sea power now can save this country's oriental trade

from being left literally on the *doorstep* of China."

Cites Lesson of Shipping Board

Hon. Eugene Talmadge, Governor of Georgia, recounted how our lack of consistency in national policy had allowed our merchant marine alternately to wax and wane. The World War caught us with only 17 vessels in overseas trade. To move our commerce and carry our men across the sea required the construction of 2500 ships at a cost of more than three billion dollars. Shipping Board losses and interest on the original shipbuilding expenditure will total nearly three billions more before the account is finally closed.

Urge Canadian-United States Agreement

Both Chairman Farrell and R. J. Major, president of the Board of Trade, Montreal, and vice-chairman of the board of directors of the Canadian Chamber of Commerce, delivered addresses urging the conclusion of a reciprocal trade agreement between Canada and the United States. Said Mr. Major:

"Canada, like the United States, is making trade agreements with other countries which are far distant from our shores. It is difficult, therefore, to understand why we cannot make a fair trade agreement with our nearest neighbor, particularly as the joint trade between our country and yours, during the last 30 years, has totaled in excess of 23 billion dollars. . . . Unless we are careful, we both will have parceled out all our commodities with other countries and there will be nothing left with which to trade."

Said Mr. Farrell:

"Viewed economically, it has long been my opinion that the colonial preferences of any country probably, in the long run, subtract from rather than add to world prosperity as a grand total. . . . As great areas of the world have politically and economically outgrown their swaddling clothes, the advancement of the world as a whole economically accrues from independence of economic action along lines of major economic advantage, rather than from too strict an adherence to economic principles dictated by the political necessities of earlier years. Undoubtedly the diversion of Canada's trade to Empire destinations and sources, resulting from the Ottawa agreements, wherever such diversion was upstream against the normal economic laws of distribution, has hindered rather than fostered world recovery. Along the same line of reasoning, I believe that the erection of tariff difficulties in the way of Canadian products coming into the United States on a basis of reasonable competition, has hurt not only the shippers of these products in Canada but likewise has diminished the prosperity of the United States."

Metal Products Federation Reviews Code Developments

ACTIVITIES during the past year of the Fabricated Metal Products Federation, the representative body of various fabricating metal industries in code development and in the preparation of a basic code, were reviewed at the first annual meeting of the federation held in Cleveland, Oct. 31. The session was devoted largely to reports of officers and committees. H. D. North, Ferry Cap & Set Screw Co., Cleveland, president of the federation, presided.

Ernest White, assistant deputy administrator of the NRA, addressed the meeting in the absence of Col. George S. Brady, assistant administrative officer of the NRA, who was scheduled to talk but who was unable to be present.

H. S. Kimball, in his report as managing director, stated that the membership of the federation Oct. 1 was 120 trade associations and 709 individuals. He stated that the work that had been done by the federation in connection with code development is recognized as sound and worthy of expansion and that the intangible efforts of the federation staff in influencing policy within the NRA and in other directions have been of real value to the industries which the federation represents. The basic code of the fabricated metal products manufacturing and metal finishing and metal coating industry has been effective almost a year, and supplementary codes for subdivisions of the industry have been put in effect during the past year.

One of the most productive arrangements that the federation has made, Mr. Kimball said, is the setting up of field men in various trade areas. This was tried on a small scale and the results were so satisfactory that now all sections are being covered or will be shortly. Up to the present time 11 field representatives have been appointed. Some policies and approvals for which the federation has been waiting from the NRA for a long time are now coming through more rapidly, Mr. Kimball stated, and he expressed the belief that the federation is in a position to be used by NRA in efforts toward industrial self-government.

Officers elected for the ensuing year were: President, W. M. Goss, vice-president Scovill Mfg. Co., Waterbury, Conn.; vice-president, A. J. Kieckhefer, president National Enameling & Stamping Co., Milwaukee; H. F. Kimball, secretary, treasurer and managing director, and C. M. Dinkins, general counsel, the latter two being reelected.

The new executive committee, which is the code authority of the Febricated Metal Products Manufacturing and Metal Finishing and Metal Coating industry, is composed of H. D. North; G. B. Durell, chairman, American Fork & Hoe Co., Cleveland; D. S. Hunter, D. S. Hunter & Associates, Cleveland; R. W. Staud, president, Porcelain Enamel Institute, Chicago; A. M. Ferry, Wire Cloth Manufacturers Association, Chicago; A. E. Payson, president, American Thermos Bottle Co., Norwich, Conn.; W. D. Disston, Henry Disston & Sons, Inc., Philadelphia, and L. D. Bement, executive secretary, American Cutlery Manufacturers Association, Greenfield, Mass.

The following 24 directors were elected: L. D. Bement; P. C. Brooks, Fairbanks, Morse & Co., Chicago; George P. Byrne, Byrne & Byrne, New York; Alexis Caswell, secretary, Twin City Machinery & Allied Products Association, Minneapolis; E. F. Copp, general manager, Waterbury Mfg. Co. Division of Chase Companies, Waterbury, Conn.; W. D. Disston; H. G. Donham, vice-president, United Shoe Machinery Corpn.; G. B. Durell; I. L. Ferris, Bridgeport Metal Goods Mfg., Bridgeport, Conn.; A. M. Ferry; R. L. Fowler, Florence Stove Co., Chicago; James Gerity, Jr., president, Master Electro Platers Institute, Toledo; W. M. Goss; Ely Griswold, vice-president, Griswold Mfg. Co., Erie, Pa.; D. S. Hunter; A. J. Kieckhefer; H. J. Leschen, president, A. Leschen & Sons Wire Rope Co., St. Louis; H. R. Naylor, the Seymour Products Co., Seymour, Conn.; H. D. North; I. S. Paull, agent Chain Institute, Washington; A. E. Payson; R. W. Staud; A. P. Van Schaick, American Chain Co., Bridgeport, and C. A. Benjamin, Finishers Trade Institute, Chicago.

National Steel Had Third Quarter Profit

THE National Steel Corpn., Pittsburgh, had net earnings in the third quarter of $347,199, after depreciation and depletion provision, interest charges and Federal income tax, equal to 16c. a share on 2,156,832 shares. This compares with $756,565 reported in the September quarter last year.

Net profits of $4,582,896 were reported for the nine-month period, which compares with $2,569,876 in the first nine months of 1933. Earnings per share for the first nine months of 1934 were equivalent to $2.12, compared with $1.19 for the same period in 1933.

THE WEEK IN WASHINGTON

Basing Point System Being Studied

NRA and Federal Trade Commission Expected to Make Joint Report To President by Dec. 1—Results May Be Significant

By L. W. MOFFETT
Resident Washington Editor, THE IRON AGE

WASHINGTON, Nov. 7.—The Federal Trade Commission and the National Recovery Administration are preparing a report on the basing point system in the iron and steel industry which is expected to be elaborate in text and illustration.

The subject of previous investigations and studies, the forthcoming report is to be made to President Roosevelt by Dec. 1 and is being prepared at his order. He asked that the report be made when on May 30 he approved the revised iron and steel code.

In his order the President said:

"Conditions of economic emergency make necessary the retention in modified form of the multiple basing point system adopted in the original code and effective in the industry for many years. But revisions made in this code, increasing substantially the number of basing points, and modifications in practice under the code, while alleviating some of the inequities in the existing system, illustrate the desirability of working toward the end of having prices quoted on the basis of areas of production and the eventual establishment of basing points coincident with all such areas, as well as the elimination of artificial transportation charges in price quotations. Therefore I have directed the Federal Trade Commission and the National Recovery Administration to study further and jointly the operation of the basing point system and its effect on prices to consumers, and any effects of the existing system in either permitting or encouraging price fixing, or providing unfair competitive advantages for producers, or disadvantages for consumers not based on actual causes. I have requested that the results of this study be reported to me within six months, together with any recommendations for revisions of the code, in accordance with the conclusions reached."

Recommendations to Be Significant

The suggestions for recommendations have been given especial significance. For not only may such recommendations result in important changes in the steel code in the future but in possible, if not the probable, legislation to change the present basing point system in the steel and other industries where it prevails. While no intimation of this kind has come from either the commission or the NRA, it is well known that ever since the former made its original report in the Pittsburgh-plus case in 1924, legislation to abolish the basing point system has been contemplated but never pushed.

The proposal has been constantly agitated and been the subject of heated controversy, reaching its high tide in the sharp row last May when the late and unlamented Darrow board recommended abolition of the basing point system and met with a blasting cross-fire from NRA through Donald Richberg, then head of NRA's legal division. Mr. Richberg also bitterly attacked the Federal Trade Commission report on the steel code submitted to the Senate last March 22 in which the commission said the use of common basing points has spread to industries other than steel and has been challenged in several Federal prosecutions as an instrument of price fixing.

Just prior to this commission report the system was attacked in a report by the NRA Consumers' Advisory Board. The commission report did not directly suggest that quotations be made f.o.b. mill but its tenor was decidedly in that direction. In attacking the Darrow board report, Mr. Richberg charged the board with ignorance and bias and with reaching contradictory conclusions, which, if put into effect, would have left nothing of the steel code except its labor provisions. Gen. Hugh S. Johnson, then National Recovery Administrator, joined Mr. Richberg in attacking both the commission and Darrow board reports and in the mildest part of his brief but blistering statement told the President that the way to destroy the industrial recovery program was to transfer the powers of fact finding and enforcement "from the NRA to the Federal Trade Commission."

In the course of his counter-attack Mr. Richberg said that the NRA "has been critical from the beginning of the price provisions of the steel code, including the set-up of the basing point system" and that "the NRA has never taken the position that any particular multiple basing point system is economically sound as a method of price quoting or legally justified." He proceeded to state, however, "that the NRA was required to observe that at least in two anti-trust prosecutions (Maple Floor Manufacturers' Asso-

ciation and Cement Manufacturers' Protective Association cases), where basing point price systems were involved, the Supreme Court has not held that such a price system was illegal per se."

Joint Report Would Be Interesting

In view of the wide conflict of opinion over the basing point system as between the Federal Trade Commission and the NRA as expressed in their reports, much interest, as well as curiosity, is manifest as to whether the two Government bodies will be able to come sufficiently near an agreement to make a "joint report," or whether each will submit its own report. Ostensibly, they are "collaborating" on a report, but each is gathering its own data and preparing its own illustrations, charts, maps, etc. Also some investigating has been done by commission staff members in the records of the American Iron and Steel Institute to supplement voluminous records already on hand gathered in connection with the investigation one decade ago of the Pittsburgh-plus system and its report of last March in response to a resolution by Senator Borah of Idaho.

Since the commission's report on the Borah resolution and the Darrow board report revision of the steel code considerably expanded the basing points, actually adding eight places at which prices for one or more products are based and bringing the number of basing points up to 66.

Production Areas To Be Defined

It was clear from the President's order, that despite this expansion in the number of basing points, he felt that a further study was necessary with a view to additional changes, "toward the end of having prices quoted on the basis of areas of production." In the trade itself it is assumed the report or reports to be made will endeavor to define the various steel producing districts, though, of course, this has been done frequently by the trade and by Government sources in a rather specific manner. The assumption, too, is that the President had in mind the possibility, if not the probability, of quoting prices on a common base for each district, rather than on an actual f.o.b. mill basis, though this assumption obviously is speculative only.

Morever, it is reported that recommendations made not only may be applied simply to code revision, if recommendations propose further changes in the basing point, but that they might be used as a basis for legislation to cover the system in all industries where it is used. It is believed, however, that no definite conclusion to this end has been reached by any means but that it is being given consideration. Also there are reports that if Congress should turn thumbs down on the NRA but provide for continuance of some of its features, including labor and fair trade practice provisions, jurisdiction over the former might be placed in the hands of the Department of Justice and of the latter in the hands of the Federal Trade Commission.

Opposed By Richberg?

Such a development would be most unusual, although shifts, contradictions and conflicts under the New Deal have become rather common. The giving to the Federal Trade Commission powers now in the hands of the NRA apparently would be especially disconcerting to Mr. Richberg in view of his past and supposedly present opposition to such a move. Morever, it would seem improbable when Mr. Richberg's position is considered for his standing at the White House is perhaps closer than that of any other official in the Roosevelt Administration. He is even being referred to as "assistant President." This popular "honorary" title was bestowed last week when the President by executive order merged the Executive Council with the National Emergency Council, making Mr. Richberg executive director and extending indefinitely his leave of absence as chief counsel of the NRA. In his position as director of the council, Mr. Richberg is the chief coordinator of the numerous alphabetical agencies of the New Deal and also the routine Government departments. Mr. Richberg likewise is an Administration member of the steel code.

It would hardly seem likely, in view of his attitude toward the basing point system as well as the steel code generally, that Mr. Richberg would approve, much less readily accede, to a proposal that NRA functions be turned over to the Federal Trade Commission. The commission, however, does have back of it the precedent of having instituted fair trade practices for industry and this fact has been cited frequently by those who would like to see it be given back that jurisdiction as well as jurisdiction over fact-finding now resting in NRA.

NRA Future Doubtful

The NRA also is an unknown quantity. Easy predictions are made in Washington and at business conventions as to what will become of it. As usual, experts disagree. It is to be supposed that the White House and the NRA are working out policies, or attempting to do so, looking to NRA's future and for Congressional action in that direction. But for any one arbitrarily to chart its course, especially at this time when NRA apparently is "feeling its way" along, is obviously guesswork. "Certain features of NRA that may be expected to be retained, however, might safely be predicted. Yet the most adept crystal gazer cannot with assurance say what the incoming Congress will do, or, for that matter, what the New Deal as a whole may decide to do. The situation is remindful of the story of the cub reporter, who, overwhelmed at the chaotic scene of the first big fire he was to cover, telephoned the city desk that "all is confusion and anything may happen."

So it is with the NRA. It is not the same NRA it was under the Johnson regime. It has made known the fact that it is not committed to either promises or policies of the brilliant and capable mind of the stormy and over-worked General, whose impetuosity frequently got him into difficulties. Spokesmen for the newly organized NRA have said the era of the spectacular and glamorous is over. Judging by its quiet, almost secretive behavior, the statement has been well supported; supported indeed to the point where it is represented as being disturbed over growing criticism of its so-called star chamber conduct. It is also increasingly clear that the President himself is taking a much more active part in directing NRA's course, which puts another color in the picture. This fact was demonstrated when the President last Friday announced renewal to Feb. 1 of the Automobile Code. For these reasons the forthcoming report on the basing point system in the iron and steel industry may bring about results considerably different from what might be more easily seen under the old regime.

President Undecided

While the President has elevated Mr. Richberg to a high position in his councils and has a cordial respect for the National Industrial Recovery Board, which is increasingly reflected in the business attitude, he is also including a strong strain of "left wing" thought and has lent an attentive ear to the Federal Trade Commission.

Certain it is that the study is being made by impressive staffs, including well known men in the fields of economics, law and industrial operations. Among the principal figures on the NRA staff who are at work on the undertaking are: Professor J. M. Clark, of Columbia University, whose work "Strategic Factors in Business Cycles" has received wide comment; Professor Malcolm P. Sharp, University of Chicago; Leon Henderson, chief, NRA Division of Research and Planning; Burr Tracy Ansell, assistant counsel, and Blackwell Smith, acting general counsel and ex-offico member of the NIRB. On the Federal Trade Commission staff are members of the legal and economic divisions.

Durable Goods Industries Form Permanent Organization at Washington

WASHINGTON, Nov. 7.—Representatives of 25 durable goods industries with $3,000,000,000 of invested capital and more than 750,000 workers, organized into a permanent group at an NRA meeting last week, after discussing many phases of codes with officials of the recovery administration. The meeting was called informally by Deputy Administrator Beverly S. King at the request of members of the industries represented and the suggestion for a permanent organization came from Irving S. Paull, Washington, secretary of the code authority for the hand chain hoist industry.

The permanent committee selected consists of the following: H. T. Richardson, New York, chairman of the code authority for the warm air furnace manufacturing industry; L. B. Lent, Philadelphia, secretary of the code authority for the scientific apparatus industry; R. E. Frederick, Philadelphia, member of the code authority for the commercial refrigerator industry; J. I. Lyle, Newark, N. J., chairman of the code authority for the unit heater industry, and Cornelius Lauritzen, New York, secretary of the code authority for the copper, bronze and related alloys trade.

Open Price Provisions Defended

Three resolutions, offered by Edwin M. Smith, Westfield, Mass., chairman of the code authority for the cast iron and radiator industry, were passed. The first affirmed the meeting's faith in the "basic principles of NRA." The second placed those voting on record as favoring a retention of open price filing provisions in codes, and the third declared industry's belief in the right to classify customers. Mr. Smith emphasized that the resolutions had been advocated only as "measures necessary in an emergency."

A fourth resolution declared that, where the public interest warrants, members of an industry shall be permitted reasonable control of individual resale prices on their products to the end that destructive competition within an industry be abolished. Two other resolutions, offered by Colonel Lent, also were passed. The first provided that, where a cost accounting formula is required by a code and desired by a substantial majority of any industry, approval of the formula be given by the Administration. The other dealt with an NRA office memorandum relating to classification of customers. Colonel Lent said he saw conflicting provisions in the memorandum. A resolution was adopted advocating elimination of possible conflicts in the memorandum by deleting that portion which gives individual authorty to classify customers.

Industries represented were the following: Copper, brass, bronze and related alloys; machinery and allied products; cooking and heating appliances; gas appliances; hand chain hoist; non-ferrous hot water tank; oil burner; scientific apparatus; steam heating equipment; warm air furnace; air valve; automatic sprinkler; steel tubular and firebox boiler; gas cock; commercial refrigerator; wholesalers plumbing and heating supply; pipe nipple; water softener and filter; cast iron boiler and radiator; unit heat and unit ventilator; refrigerating machinery; coal storage door; plumbing fixture; warm air register and water heater.

Harriman Statements Interesting

Outstanding features of the meeting were two points made informally by W. Averill Harriman, recently selected as the NRA administrative executive officer to succeed Col. G. M. Lynch, resigned. Mr. Harriman, chairman of the board of the Union Pacific Railroad, said that code provisions against selling below cost were unwise and that restrictions against installation of new production machinery were "medicine worse than the disease."

His views were given much attention by reason of his high rank in the councils of NRA. Morever, the sentiments he expressed are unquestionably increasing in popularity. This view regarding restrictions against selling below cost is distinctly unpopular with business and industry generally, but consumer opinion is gaining more attention in NRA and perhaps accounts for the trend toward elimination of provisions barring sales below cost.

Restrictions on the installation of new machinery or on machine hour operations also are becoming a growing target for criticism, especially from economists and many producing interests. On the other hand, where demand is far below capacity in many lines, vigorous efforts are being made to maintain these restrictions.

This was emphasized at a hearing last week regarding limitation of machine hours in the lace manufacturing industry. It was reported that NRA actually had decided to lift all production control provisions, though officials of NRA have denied the report. Nevertheless, talk of removal of such restrictions has become common around NRA offices and among those advocating their elimination are such prominent men as Leon Henderson, chairman, Division of Research and Planning.

Mr. Harriman frankly told the durable goods representatives that the present is the crucial period and that what happens in the next couple of months will influence Congress. He told the representatives that it is high time "that groups such as yours consider the fundamental problems of your industries."

Further Code Consolidation

Col. George S. Brady, assistant administrative officer of NRA, said that "most of the bugaboo of 'code interference' will disappear if code authorities get together and agree upon uniform labor provisions in similar industry groups. He stated that NRA hopes to consolidate collections of code assessments through master code authority collections for related industries, or through some form of coordinated collection of single assessments for distribution of the various code authorities. Reviewing the NRA's early efforts to reduce the 4000 codes proposed during the first month of the Administration, and the new groupings into 22 master groups, Colonel Brady said the whole thing logically fits into four great industry and trade groupings, consisting of producing industries, fabricating industries, service industries and distributing trades.

Colonel Brady said that as long as the small industries retain separate codes they are going to be confronted with the problem of operating under varying labor provisions and of paying assessments to more than one code authority "which seems to be at present the chief source of complaint."

He declared that only one thing will really solve the problem and that is for code authorities to get together and agree upon uniform labor provisions in similar industry groups, and then come to NRA with the proposition to change the codes accordingly. He expressed hope of solution under the new alinement of industry groupings by having master code authorities or, at any rate, some form of coordinating committees delegated by the individual code authorities to collect single assessments and distribute them equitably.

Hyatt Bearings for "Flying Yankee"

EDWARD G. BUDD Manufacturing Co., Philadelphia, has placed an order with the Hyatt Roller Bearing Co., of Newark, N. J., for journal bearings and boxes for the Boston & Maine Railroad's new streamlined "Flying Yankee." This is the new Diesel-electric light-weight, high speed articulated train contracted for by the Boston & Maine with the Winton Engine Division of the General Motors Corpn. It will operate between Boston, Portland and Bangor, traveling 700 miles daily on fast schedules.

October Steel Production 17 Per Cent Ahead of September Total

PRODUCTION of steel ingots last month amounted to 1,461,932 gross tons, according to the American Iron and Steel Institute, a gain of 17 per cent over the September total of 1,251,630 tons. Last October ingot output was 2,084,894 tons. As there were two more working days in October this year than in September, daily production did not show such a marked gain. Companies reporting to the Institute made steel at a rate of 54,146 tons daily last month, or at an average of 24.59 per cent of capacity, compared with 50,065 tons daily or 22.74 per cent in September.

In the first 10 months of 1934 steel ingot output totaled 21,730,394 tons, compared with 19,274,284 in the corresponding 1933 period and with 22,594,079 tons in all of last year.

MONTHLY PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)

Reported for 1933 by Companies Which Made 97.82 Per Cent of 1933 Ingot Output

1933	Open-Hearth	Bessemer	Calculated Output All Companies Monthly	Calculated Output All Companies Daily	No. of Working Days	Per Cent Operation‡
January	885,663*	109,000	1,016,870†	39,110†	26	17.99†
February	922,798*	126,781	1,073,012†	44,709†	24	20.57†
March	784,111*	94,509	898,236†	33,268†	27	15.30†
April	1,180,823*	135,217	1,345,422†	53,817†	25	24.76†
May	1,716,425*	216,841	1,976,428†	73,201†	27	33.68†
June	2,211,652*	296,765	2,564,420†	98,632†	26	45.37†
July	2,743,326*	355,836	3,168,354†	126,734†	25	58.30†
August	2,430,663*	370,370	2,863,569†	106,058†	27	48.79†
September	1,991,204*	242,014	2,283,079†	87,811†	26	40.40†
October	1,847,690*	191,673	2,084,894†	80,188†	26	36.89†
November	1,331,029*	156,939	1,521,189†	58,507†	26	26.92†
December	1,629,495*	129,834*	1,798,606†	71,944†	25	33.10†
Total	19,674,879*	2,425,779*	22,594,079†	72,884†	310	33.53†

* Revised. † Adjusted.
‡ The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1932, of 67,386,130 gross tons for open-hearth and Bessemer steel ingots.

Reported for 1934 by Companies Which Made 99.39 Per Cent of Ingot Production in 1933

1934						
January	1,786,467	172,489	1,970,979*	72,999*	27	33.15*
February	1,993,638	175,873	2,182,826*	90,951*	24	41.31*
March	2,540,143	203,904	2,760,888*	102,255*	27	46.44*
April	2,622,372	257,482	2,897,529*	115,901*	25	52.64*
May	3,000,624	331,620	3,352,695*	124,174*	27	56.39*
June	2,714,983	282,592	3,015,972	115,999	26	52.68
July	1,343,732	119,869	1,472,584	58,903	25	26.75
August	1,245,445	109,598	1,363,359	50,495	27	22.93
September	1,126,415	117,580	1,251,630	50,065	25	22.74
October	1,325,225	127,789	1,461,932	54,146	27	24.59
Ten Months	19,699,044	1,898,796	21,730,394	83,578	260	37.96

* Revised.
‡ The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1933, of 68,478,813 gross tons for open-hearth and Bessemer steel ingots.

... OBITUARY ...

ALGER R. WILLIARD, assistant sales manager of the Cleveland district of Carnegie Steel Co., died in Lakeside Hospital, Cleveland, Nov. 3, after an illness of two weeks, at the age of 46 years. For 27 years he had been connected with the sales department of the Carnegie company. Mr. Williard was born in Jefferson, Md. He attended Georgetown University and his first position was as a stenographer in the sales office of the Carnegie company in Washington, where he remained about two years. From there he was transferred to Pittsburgh where while employed in the office in the daytime he attended night school at the Carnegie Institute of Technology for three years. From Pittsburgh he was transferred to Detroit where he enlisted soon after our entrance into the World War. On his discharge from the army two years later he returned to the Carnegie offices in Pittsburgh and shortly was sent to Cleveland, becoming assistant district sales manager in the Cleveland district a few months later.

ALGER R. WILLIARD

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GEORGE W. DRAKE, chief machine designer of the Warner & Swasey Co., Cleveland, died Nov. 3, aged 73 years. Born in Worthington, Mass., he secured employment with Pratt & Whitney Co., Hartford, Conn., in 1880, where he spent four years as an apprentice and four years as a journeyman machinist. He went with the Warner & Swasey Co. in 1888 as a draftsman and was associated with that company a total of 40 years, leaving the company for a few years, during which time he was associated with Bardons & Oliver and the Brush Electric Co., Cleveland. He became associated with Charles F. Brush soon after Mr. Brush had developed the arc light and was a valuable aid to Mr. Brush in designing and experimental work in connection with arc lights. While connected with the Warner & Swasey Co. he developed a number of machine mechanisms for which he was given patents. Although not having the benefit of more than a primary school education, Mr. Drake became an expert mathematician. He was a frequent contributor of articles on machine design to some of the technical publications.

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FRANKLIN SCHNEIDER, one of the founders and for several years president of the former Van Dorn Electric Tool Co., Cleveland, died in Hollywood, Fla., Nov. 3, aged 73 years.

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ORVILLE M. MCCORNACK, former vice-president of the Hudson Motor Car Co. and well known among steel men, died at his home in Detroit on Oct. 30.

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GUSTAVE J. MAERTENS, president of the Ajax Bolt & Screw Co., Detroit, died in Detroit on Nov. 1 of injuries suffered in an automobile accident three days previous.

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RUSSELL M. BENNETT, financial and industrial leader of Minneapolis, Minn., and one of the pioneers in the Minnesota ore mining industry, died Oct. 31, aged 69 years.

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EMERY E. DUNNING, president of the Dunning Furnace Co., Milwaukee, died Oct. 28, aged 70 years. For 27 years he was chief engineer of the former Schwab & Sercomb Foundry & Furnace Co., resigning in 1926 to establish his own business.

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ARTHUR HAYSSEN, president and treasurer, Hayssen Mfg. Co., Sheboygan, Wis., died Oct. 20, aged 58 years. He was widely known as an inventor and designer of special machinery.

... PERSONALS ...

ROSCOE SEYBOLD, formerly comptroller of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., WILLIAM G. MARSHALL, heretofore assistant to vice-president, and RALPH KELLY, director of budgets, have been elected vice-presidents. Mr. Seybold joined the Westinghouse company immediately after his graduation from Purdue University in 1907 and has been continuously identified with the company in various executive capacities. Mr. Marshall had a wide experience in the electrical industry before joining the Westinghouse organization in 1929 as assistant to the vice-president in charge of industrial relations. Mr. Kelly became identified with the company as a design engineer in 1909 after his graduation from Harvard University and was manager of the Southwestern district and later manager of the Central district. From this position he was transfered to East Pittsburgh in the capacity of director of budgets.

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WALLACE H. ROWE, JR., a director of Pittsburgh Steel Co., Pittsburgh, has been made a member of the executive committee.

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L. M. KLINEDINST, since 1930 vice-president in charge of all industrial sales of the Timken Roller Bearing Co., Canton, Ohio, has been elected to the board and also promoted to the office of vice-president in charge of sales, to fill the vacancy created by the resignation of JUDD W. SPRAY. Mr. Klinedinst became associated with the Timken company 29 years ago immediately upon completing his schooling. Subsequently he was identified with automotive development work, serving as assistant sales manager. He was made general manager of the industrial division of the company 13 years ago. T. V. BUCKWALTER, who has been vice-president of the Timken Roller Bearing Co. for several years, has been elected vice-president and director of the Timken Steel & Tube Co.

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C. M. BROOME, JR., has been made assistant district manager of the newly established sales office in Atlanta, Ga., of the American Rolling Mill Co., Middletown, Ohio. The new office, which will be located in the Citizens and Southern National Bank Building, will serve Florida, South Carolina, Alabama, Georgia and parts of Tennessee and North Carolina.

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RALPH R. WEDDELL, consulting engineer, who recently returned from England after establishing the manufacture of serrated blade cutters there, has become identified with the Ingersoll Milling Machine Co., Rockford, Ill., in charge of the design and sale of small tools.

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GEORGE W. STARR, for many years director of purchases of the United Alloy Steel Corpn., has been appointed general manager of sales of the Ohio Ferro-Alloys Corpn., Canton, Ohio.

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CHARLES H. REINERT, formerly superintendent of the Brooklyn plant of Steel & Tubes, Inc., has become assistant superintendent of the electric weld tube mill at the parent company, the Republic Steel Corpn., Youngstown. N. B. STEELE, until recently a sales engineer in the Cleveland office of Steel & Tubes, Inc., has been transferred to the Boston office to assist E. T. GLASS, sales manager of the New England division.

Roscoe Seybold

William G. Marshall

Ralph Kelly

J. C. VORHAUER has been appointed director of purchases, effective Nov. 1, by the General American Transportation Corpn. and its subsidiaries. Headquarters will be at Chicago.

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THOMAS BRADLEY has been named director of purchases of the Hupp Motor Car Corpn., Detroit. He joined the purchasing staff of the Paige-Detroit Co. in 1911 and four years later became purchasing agent and afterwards vice-president and member of the board. When the company became the Graham-Paige Motors Corpn. he continued in charge of purchases until his resignation in June, 1933. Since then he has been engaged in the automotive parts business. He will work directly under A. J. BRANDT, recently appointed assistant general manager of Hupp in charge of engineering, manufacturing and purchasing.

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D. BLAIR BURLEIGH, vice-president of the Sterling French Machinery Co., Detroit, sailed on Oct. 20 for Europe to attend the Olympic Show in London and also to visit Paris.

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HARRY D. FENSKE has been appointed by Gov. William A. Comstock a member of the commission for the Port of Detroit to fill the unexpired term of GEORGE R. FINK, who has resigned. Mr. Fenske is manager of the transportation and export department of the Great Lakes Steel Corpn., Detroit, of which Mr. Fink is president, and has been serving as secretary of the commission known as the Port of Detroit Authority since its formation in January this year. The commission has jurisdiction over the transportation and waterfront facilities in Wayne County, Mich., under powers provided for by State legislation and adopted by the voters of Wayne County at the elections last November.

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LABERT ST. CLAIR, New York, has been appointed transportation assistant by Secretary of Commerce Roper. Mr. St. Clair is a nationally known transportation authority. During the last 15 years he has specialized in rail and motor transit, particularly as it relates to coordination with other forms of commerce. He also is the author of a standard history of all types of land, water and air transportation used since the beginning of civilization. Before entering the transit field, Mr. St. Clair was a Washington newspaper correspondent.

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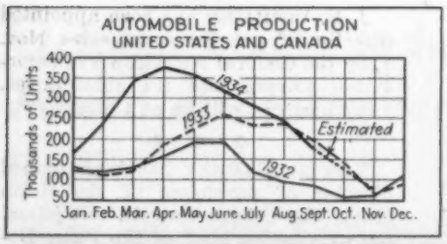
ADOLPH FAGERLUND, senior partner of Carl Setterwall & Co., A.B., of Stockholm, Sweden, has arrived on a visit to this country. During his stay in New York, Mr. Fagerlund will make his headquarters with the representatives of his firm, A. Milne & Co.



THIS WEEK ON THE

Ford's Plans and Renewal of Automobile Code Buoy Detroit Sentiment

DETROIT, Nov. 7.

FORMAL announcement by Henry Ford that he intends to make "1,000,000 cars or better" in 1935 and renewal of the automobile code without change for 90 days have buoyed sentiment in the automotive world. Mr. Ford dramatically and concisely remarked that "so far as the Ford Motor Co. is concerned the depression is over." He indicated that Ford disbursements for wages, materials, parts and other requirements next year would be more than $415,000,000.

The cynics are pointing out that Ford will build 1,000,000 cars if that many units can be sold, but there is no assurance that Ford dealers will be able to sell such a huge number. True, but anyone familiar with the competitive situation among the Big Three would be intrepid indeed to stake much money on the possibility that the Sage of Dearborn will not attain his goal. In the first nine months of this year Ford built about 755,000 units and for the entire year will make considerably more than 800,000 units. So the million mark isn't going to be such a hurdle after all.

Especially is this belief strengthened as one watches the confusion which has taken possession of Mr. Ford's chief competitors. They seem to have become infected with a bad case of "Forditis" which already has developed into the most severe attack of jitters in years. Unquestionably, at the moment, Ford is in better command of the situation than in several years. Competitors are worried not only at the prospect of the snappiest looking Ford in history, but also at the price tag which will be put on it. They are worrying about ways and means of reducing costs so that they can keep their own prices in line with Ford prices in 1935.

Plymouth, deciding to institute eleventh hour changes, has suspended manufacturing of its new car for about two weeks. It is understood that this decision was made after the so-called "pilot cars" to test the production set-up on the new jobs had been run off the line. Casting about for practical means of paring costs, Plymouth is reported to have eliminated knee-action units as standard equipment from its 1935 cars. This is said to result in a saving of around $22 per car. Plymouth never has committed itself to knee action so strongly in its advertising as has Chevrolet. Despite Plymouth's junking of knee action, Chevrolet is expected to carry on with it as regular equipment on its Master passenger cars during the coming year. It never has been on Chevrolet's Standard models.

Both Chevrolet and Plymouth may well rue the day that they took up with knee action, for it has cost them a pretty penny. It has cut down considerably their profits per car and what is worse (from their standpoint) was responsible in large measure for the long lead which Ford got early in 1934. The departments in which independent springing units were being built were the bottlenecks holding up production in both companies, while Ford was turning out cars at will.

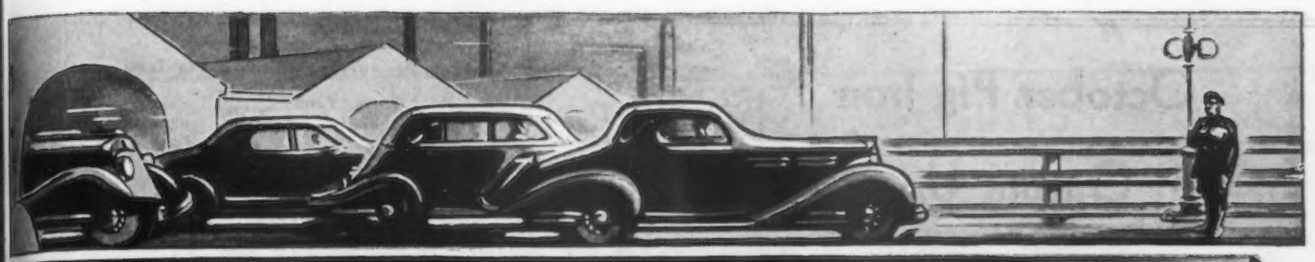
It wouldn't surprise anyone in Detroit if coil spring knee action eventually goes the way of free wheeling. A few years ago motor car manufacturers fell over each other in the rush to add free wheeling. Few cars have this feature today, and those which do regard it as incidental and subordinate to other mechanical features. The only kind of knee action likely to survive must cost much less than the coil spring type. This is the reason why the members of the Leaf Spring Institute feel so encouraged about the possibilities of their springing system using leaf springs.

The effort of Mr. Ford's competitors to get lower costs hasn't stopped with the product itself and what should go into it, but in the case of one large corporation is said to have extended to non-productive salaried employees in the form of a cut ranging from 5 to 10 per cent. This action is regarded in automotive circles as a very poor piece of strategy in view of the fact that the corporation has had relatively good earnings this year and even distributed to stockholders an extra cash dividend.

New Ford Has Sweeping Lines

Reliable reports about the new Ford car say that it strongly resembles the Chrysler Airflow in general sweeping lines, although it hasn't the stubby front-end appearance of the latter, retaining instead some of the features long associated with more conventionally designed cars. The rear part of the body is understood to have the graceful slope possessed by the Victoria model which was introduced last spring. The distance between the radiator and the cowl is shorter than in the present V-8 and the wheelbase longer. The engine has been brought farther forward so that both the front and rear seats have been moved forward, with the latter seat put ahead of the rear axle, thus giving a better ride. In some respects the car is said to resemble the Briggs dream car shown at Ford's Detroit and New York shows a year ago, although it is not nearly so radical as the latter.

Ford will be in volume production at the Rouge plant early in December. Having completed its 1934 run, Ford now is down until retooling is



ASSEMBLY LINE

By BURNHAM FINNEY
Detroit Editor, THE IRON AGE

finished. Recently about 55,000 men have been employed by Ford in the Detroit district, but the number is much less at present. However, when operations get into full swing again, Ford estimates that its employment will rise to the point where 87,000 men will be at work in Dearborn and vicinity.

In connection with its expansion of production facilities at Rouge, Ford has placed an order for grinding machines totaling around $150,000 and has awarded sizable contracts to at least two Detroit companies for rebuilding equipment. Other large orders for machine tools, jigs and fixtures are pending. Ford's expenditures for machinery are expected to be $2,500,000. As first related in this column last week, installation of this equipment will make possible the production of 4800 units in 16 hours or, in case retail demand should justify a higher schedule, of 7200 units in 24 hours.

Citroen to Buy Equipment

Citroen, which about a year ago bought a large amount of equipment in this country, again is in the market for machinery. It is said to have made arrangements for the manufacture of the Spicer universal joint and shock absorbers in France. While as much of the machinery as necessary for this production job will be bought abroad, a Citroen production official is in this country at present for the purpose of purchasing equipment valued at about $100,000. The American headquarters of Citroen are at 968 National Bank Building, Detroit.

Auto Roofs of Steel

The steel roof is coming rapidly to the front. Fisher body is reported to have developed it so that it will be standard equipment on the Chevrolet, Pontiac and Oldsmobile in 1935. The other General Motors divisions probably will have all-steel roofs on their new cars to be presented next spring. Hudson has decided upon a steel roof for its Hudson and Terraplane cars. With the use of steel, the roof becomes an important structural member of the car just as is the deck of a ship in marine construction. In cars employing unit engineering, where the body and chassis are virtually one, this added structural roof member just about reaches the acme of solid rigidity. Heretofore, the roof has been made of soft material to avoid the drumming or diaphragm effect resulting from the use of a flat steel plate over the top of the body. Advanced knowledge in the art of silencing, however, has eliminated this difficulty.

Packard Buys Tools

Packard has placed orders for crankshaft equipment for its new car totaling about $75,000. The transaction involved purchase of several new machines and the rebuilding of old machines. Practically all the equipment needed for the connecting rod and camshaft departments will consist of rebuilt machinery. Packard is tooling up its plant south of Grand Boulevard for production of 10 cars an hour. It has bought new molding machines for its foundry for use in making castings for the new job.

Officials of Ford of England are in the United States partly for the purpose of buying machine parts in connection with the rebuilding of machinery at the Dagenham plant. A commission is in this country from Soviet Russia considering the purchase of machinery for the Autostroy plant where model A Fords are manufactured. It is understood that a decision has been reached to increase the productive capacity of the Autostroy plant and this will necessitate duplicating some of the equipment already installed there. Total expenditures, however, are not expected to be large.

Buick, working on a new engine for models to be introduced next spring, may be in the market for some machinery in December, although it appears doubtful whether much money will be spent for new equipment. Cadillac is expected to be a factor in the purchase of machine tools when its tooling program for spring gets under way.

New Hupmobile Announced

Hupmobile has announced its 1935 cars, presenting a four-door sedan and two-door, five-passenger coupe listing at $695, or $100 less than the 1934 edition. General design of the cars is the same as during the past year. The most important change is the addition of Steeldraulic power brakes, made by Midland Steel Products Co., as standard equipment. Increased horsepower is achieved by means of changes in cam contour and in combustion chamber design. Hupmobile's bodies will be built by Hayes Body Corpn. at Grand Rapids because they can be made outside at a lower price than Hupp can produce them in its Cleveland body plant, which is being closed. Hayes also will produce bodies for Reo passenger cars and body parts for Reo commercial car cabs.

Steel Production

After being maintained at 76 per cent for several months, the steel ingot operating rate at Detroit has dropped 23 points to 53 per cent. Ford is running five out of nine open-hearth furnaces and Great Lakes four out of eight. Ford's steel finishing mills are operating on a basis of two shifts a day. Although Ford is estimated to have close to 200,000 tons of steel stored in its yards at Rouge, it will continue to produce raw steel until well into the first quarter of next year. When facilities are completed at Dearborn for the handling of larger steel ingots, the 400-ton open-hearth furnace, largest in the steel industry, will be used to make heats direct. Heretofore this furnace has been employed for duplexing purposes. The Ford steel plant at present uses a steel ingot about half the size of that made by commercial steel companies.

The matter of whether a steel wire

(Continued on Page 77)

October Pig Iron Output Up 2.5 Per Cent

PRODUCTION of coke pig iron in October totaled 951,062 gross tons, compared with 898,043 tons in September. The daily rate in October, at 30,679 tons, increased 2.5 per cent over the September rate of 29,935 tons a day.

There were 65 furnaces in blast on Nov. 1, making iron at the rate of 31,310 tons a day, compared with 62 furnaces on Oct. 1, operating at the rate of 28,215 tons a day. Seven furnaces were blown in during October and four were blown out or banked. The Steel Corporation blew in one furnace. Independent steel companies blew in six furnaces, one of them a merchant furnace, and blew out or banked three, two of which were merchant furnaces. Merchant producers blew out or banked one.

Among the furnaces blown in are the following: one Lackawanna, Bethlehem Steel Co.; one Aliquippa, Jones & Laughlin Steel Corpn.; one Monongahela, National Tube Co.; one Monessen, Pittsburgh Steel Co.; one Hazleton, Republic Steel Corpn.; one Riverside, Wheeling Steel Corpn., and one River, Corrigan, McKinney Steel Co.

Furnaces blown out or banked included: One Susquehanna, National Steel Corpn.; one LaBelle, Wheeling Steel Corpn.; one Federal, Interlake Iron Corpn., and one Pioneer, Republic Steel Corpn.

Daily Average Production of Coke Pig Iron

Gross Tons

	1934	1933	1932	1931
January	39,201	18,348	31,330	55,299
February	46,131	19,798	33,251	60,950
March	52,243	17,484	31,201	65,556
April	57,561	20,787	28,430	67,317
May	65,900	28,621	25,276	64,325
June	64,338	42,166	20,935	54,621
½ year	54,134	24,536	28,412	61,356
July	39,510	57,821	18,461	47,201
August	34,012	59,142	17,115	41,308
September	29,935	50,742	19,753	38,964
October	30,679	43,754	20,800	37,848
November	.....	36,174	21,042	36,782
December	.....	38,131	17,615	31,625
Year	.....	36,199	23,733	50,069

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1934	1933	1934	1933
January	1,215,226	568,785	11,703	8,810
February	1,263,673	554,330	10,818	8,591
March	1,619,534	542,011	17,605	4,783
April	1,726,851	623,618	15,418	5,857
May	2,042,896	887,252	10,001	5,948
June	1,930,133	1,265,007	10,097	13,074
½ year	9,798,313	4,441,003	75,642	47,063
July	1,224,826	1,792,452	10,188	13,661
August	1,054,382	1,833,394	8,733	16,953
September	898,043	1,522,257	7,100	13,339
October	951,062	1,356,361	9,830	16,943
November	.....	1,085,239	.....	14,524
December	.....	1,182,079	.....	9,369
Year	.....	13,212,785	.....	136,852

*These totals do not include charcoal pig iron. The 1932 production of this iron was 15,055 gross tons.
†Included in pig iron figures.

Merchant Iron Made, Daily Rate

Tons

	1934	1933	1932
January	7,800	2,602	6,256
February	7,071	2,863	7,251
March	7,197	2,412	7,157
April	8,838	1,908	5,287
May	9,099	3,129	4,658
June	9,499	4,088	6,090
July	7,880	6,783	3,329
August	6,043	7,756	3,070
September	5,986	10,034	3,213
October	5,765	8,634	4,286
November	....	7,639	4,435
December	....	8,358	3,674

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons) October (31 Days)	Production (Gross Tons) September (30 Days)	November 1 Number in Blast	November 1 Operating Rate, Tons a Day	October 1 Number in Blast	October 1 Operating Rate, Tons a Day
New York:						
Buffalo	59,617	50,938	4	2,050	4	1,765
Other New York and Mass.	18,216	17,246	2	590	2	575
Pennsylvania:						
Lehigh Valley	26,884	23,440	3	865	3	780
Schuylkill Valley	....	11,313	0	....	0	....
Susquehanna and Lebanon Valleys	10,860	11,444	1	350	1	380
Ferromanganese	....	....	0	....	0	....
Pittsburgh District	177,588	185,209	13	6,285	10	5,400
Ferro. and Spiegel	4,020	4,006	1	130	1	165
Shenango Valley	16,678	13,776	1	540	1	460
Western Pennsylvania	16,197	19,795	1	520	1	660
Ferro. and Spiegel	5,810	3,094	1	185	1	125
Maryland	52,046	28,067	2	1,680	2	935
Wheeling District	69,549	58,845	4	2,015	4	1,810
Ohio:						
Mahoning Valley	72,591	67,333	4	2,505	3	1,785
Central and Northern	87,172	77,471	7	3,270	6	2,605
Southern	18,161	14,747	2	585	2	515
Illinois and Indiana	179,154	177,295	9	5,485	10	5,910
Mich. and Minn.	45,925	46,193	3	1,480	3	1,420
Colo., Mo. and Utah	19,002	17,879	2	615	2	595
The South:						
Virginia	....	....	0	....	0	....
Kentucky	12,929	12,010	1	415	1	400
Alabama	58,663	57,842	4	1,745	5	1,930
Ferromanganese	....	....	0	....	0	....
Tennessee	....	....	0	....	0	....
Total	951,062	898,043	65	31,310	62	28,215

Scrap Has Stronger Tone at Detroit

DETROIT, Nov. 6.—Although consumers are showing little interest in placing new scrap business, prices continue to display strength because of the desire of dealers to buy against short orders and because of extremely small scrap production by the automobile industry. Ford has purchased a small tonnage of steel scrap in the open market because its operations at Rouge have not been sufficiently high to yield the required amount to meet its open-hearth furnace demands. This is regarded, however, as a temporary situation which will be relieved as soon as manufacture on a production basis is resumed at Dearborn. Automotive cast and low phosphorus plate scrap are up 25c. a ton and No. 1 machinery cast 50c. In some cases dealers are paying more than the market prices to acquire attractive tonnages.

SUMMARY OF THIS WEEK'S BUSINESS

Automotive Releases Cause Steel Production to Rise Further

Passing of Pre-election Uncertainty and Extension of Automobile Code Are Favorable Factors—Scrap Higher

THE extension of the automobile code and the passing of pre-election uncertainties have cleared the way for further improvement in iron and steel demand. While no spectacular gains are likely during the remainder of the year, in view of the approach of the inventory season, a steady and perhaps accelerating upward trend is looked for.

In 1933, the month of November marked the low point of steel output in the second half of the year and December brought a substantial increase. This year, with current operations at 26½ per cent as against 26 per cent 12 months ago, production should follow a similar course. Whether output will rise as high as in December, 1933, when it averaged 33 per cent, will depend mainly on the rapidity with which motor car companies get their new models into full production.

PLYMOUTH has encountered fresh delay in getting under way on its 1935 program and Chevrolet is moving ahead slowly, but Ford, now down for retooling, will get into volume production early in December.

Ford has temporarily taken off four open-hearth furnaces, reducing the Detroit steel ingot rate from 76 to 53 per cent. Reports from other districts disclose that steel plant operations are unchanged at 18 per cent at Pittsburgh, 30 per cent at Chicago, 24 per cent in the Philadelphia district, 27 per cent at Buffalo and 25 per cent in the South, but have risen four points to 26 per cent in the Valleys, two points to 39 per cent in the Cleveland-Lorain area, and six points to 36 per cent in the Wheeling district. The national average, at 26½ per cent, is one-half point higher than one week ago.

EXTENSION of the automobile code over the protests of organized labor is regarded as fresh evidence of the Administration's desire to avoid disturbances likely to hold back or block the current industrial upturn. Although reassured by this development, the steel industry has not been freed from causes of apprehension. The organization of the Steel Labor Relations Board, hailed as a step toward industrial peace, actually served as the signal for a sharp increase in union agitation among steel workers. The "cases" submitted to that tribunal have piled up with startling rapidity. The basing point issue, long a favorite in political circles, is due to come up again Dec. 1, when the Federal Trade Commission and the NRA will submit reports to the President. It is understood, however, that these reports will be of a preliminary nature.

OUTSIDE of the motor car industry, demand for iron and steel has shown comparatively little expansion. Manufacturers of steel barrels and drums are buying more freely, after having been virtually out of the market since last June. Farm implement makers are gradually increasing their releases, and boiler and radiation plants are more active. On the other hand, tin plate output has undergone a further decline from 40 to 37 per cent of capacity. Most buyers are drawing on stocks, delaying fresh purchases until the price for 1935 is announced. This reduction of inventory, of course, augurs well for a substantial gain in production later on.

A Northwestern railroad is about to place 10,000 tons of rails and the Norfolk & Western has virtually closed for a similar quantity. The Illinois Central has ordered a five-car Diesel-electric high-speed train and 11 Diesel locomotives. Various railroads have launched extensive air-conditioning programs.

Fabricated structural steel awards total only 7550 tons and new projects 7000 tons. Several large pending projects, however, are about to reach the bidding stage. The New York Federal building, on which figures will be taken Nov. 9, will call for a maximum of 28,000 tons of steel. On Nov. 12 new bids are to be taken on the Fort Peck, Mont., spillway, requiring 18,000 tons of reinforcing bars and 722 tons of sealing strips. San Francisco has purchased 7460 tons of cast iron pipe.

PIG IRON production in October totaled 951,062 tons, or 30,679 tons a day, compared with 898,043 tons, or 29,935 tons daily, in September. The gain in terms of daily rate was 2.5 per cent. Sixty-five furnaces were in blast Nov. 1 compared with 62 furnaces one month previous.

Scrap, as measured by THE IRON AGE composite, has advanced from $9.63 to $9.71 a ton. The recent reduction of $6 a ton on spring wire has been followed by an equally sharp cut on spoke wire. THE IRON AGE composites for finished steel and pig iron are unchanged at 2.124c. a lb. and $17.90 a ton.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	Nov. 7, 1934	Oct. 30, 1934	Oct. 9, 1934	Nov. 8, 1933
Per Gross Ton:				
No. 2 fdy., Philadelphia	$20.26	$20.26	$20.26	$18.26
No. 2, Valley furnace	18.50	18.50	18.50	17.50
No. 2 Southern, Cin'ti	19.13	19.13	19.13	18.13
No. 2, Birmingham†	14.50	14.50	14.50	13.50
No. 2 foundry, Chicago*	18.50	18.50	18.50	17.50
Basic, del'd eastern Pa.	19.76	19.76	19.76	17.76
Basic, Valley furnace	18.00	18.00	18.00	17.00
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	19.76
Malleable, Chicago*	18.50	18.50	18.50	17.50
Malleable, Valley	18.50	18.50	18.50	17.50
L. S. charcoal, Chicago	24.04	24.04	24.04	23.54
Ferromanganese, seab'd carlots	85.00	85.00	85.00	82.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.
*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$36.37½
Light rails, Pittsburgh	35.00	35.00	35.00	32.00
Rerolling billets, Pittsburgh	27.00	27.00	27.00	26.00
Sheet bars, Pittsburgh	28.00	28.00	28.00	26.00
Slabs, Pittsburgh	27.00	27.00	27.00	26.00
Forging billets, Pittsburgh	32.00	32.00	32.00	31.00
Wire rods, Pittsburgh	38.00	38.00	38.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.70	1.70	1.70	1.60

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.80	1.80	1.80	1.75
Bars, Chicago	1.85	1.85	1.85	1.80
Bars, Cleveland	1.85	1.85	1.85	1.80
Bars, New York	2.13	2.13	2.13	2.08
Plates, Pittsburgh	1.80	1.80	1.80	1.70
Plates, Chicago	1.85	1.85	1.85	1.75
Plates, New York	2.08	2.08	2.08	1.98
Structural shapes, Pittsburgh	1.80	1.80	1.80	1.70
Structural shapes, Chicago	1.85	1.85	1.85	1.75
Structural shapes, New York	2.05¼	2.05¼	2.05¼	1.95¼
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	1.95
Hot-rolled strips, Pittsburgh	1.85	1.85	1.85	1.75
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.40

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.40	2.40	2.40	2.25
Hot-rolled annealed sheets, No. 24, Gary	2.50	2.50	2.50	2.35
Sheets, galv., No. 24, P'gh	3.10	3.10	3.10	2.85
Sheets, galv., No. 24, Gary	3.20	3.20	3.20	2.95
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	1.75
Hot-rolled sheets, No. 10, Gary	1.95	1.95	1.95	1.85
Wire nails, Pittsburgh	2.60	2.60	2.60	2.10
Wire nails, Chicago dist. mill	2.65	2.65	2.65	2.15
Plain wire, Pittsburgh	2.30	2.30	2.30	2.10
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.15
Barbed wire, galv., Pittsburgh	3.00	3.00	3.00	2.60
Barbed wire, galv., Chicago dist. mill	3.05	3.05	3.05	2.65
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$4.65

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$10.50	$10.50	$10.25	$11.50
Heavy melting steel, Phila.	9.63	9.63	9.50	9.75
Heavy melting steel, Ch'go	**9.00**	8.75	8.75	8.75
Carwheels, Chicago	**10.00**	9.50	9.50	9.50
Carwheels, Philadelphia	10.50	10.50	11.25	10.75
No. 1 cast, Pittsburgh	11.25	11.25	11.25	11.25
No. 1 cast, Philadelphia	10.75	10.75	11.75	11.25
No. 1 cast, Ch'go (net ton)	8.00	8.00	8.00	8.50
No. 1 RR. wrot., Phila	11.25	11.25	11.25	11.00
No. 1 RR. wrot., Ch'go (net)	**8.00**	7.00	7.00	7.25

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.85	$3.85	$3.85	$3.75
Foundry coke, prompt	4.60	4.60	4.60	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery	8.75	8.75	8.75	7.75
Lake copper, New York	9.12½	9.12½	9.12½	8.00
Tin (Straits), New York	51.25	51.25	50.75	51.37½
Zinc, East St. Louis	*3.75*	3.85	3.87½	4.50
Zinc, New York	*4.10*	4.20	4.22½	4.85
Lead, St. Louis	*3.50*	3.55	3.45	4.15
Lead, New York	*3.65*	3.70	3.60	4.30
Antimony (Asiatic), N. Y.	**10.50**	9.75	9.00	6.70

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

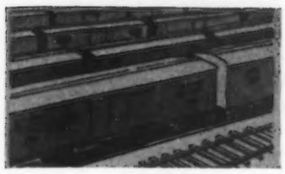
▲ ▲ ▲

▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
Nov. 7, 1934	2.124c. a Lb.	$17.90 a Gross Ton	$9.71 a Gross Ton
One week ago	2.124c.	17.90	9.63
One month ago	2.124c.	17.90	9.50
One year ago	1.995c.	16.61	10.00
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1934	2.199c., April 24	2.008c., Jan. 2	$17.90, May 1	$16.90, Jan. 27	$13.00, Mar. 13	$9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.42, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Elections Clear Atmosphere In Pittsburgh District



But No Rapid Increase in Business Is Looked For—Local Ingot Output Unchanged But Valley and Wheeling District Rates Rise

PITTSBURGH, Nov. 7.—With politics overshadowing all other topics the local steel market is practically marking time. The outcome of the elections is not expected to exert any unusual influence upon steel trade for the remainder of the year. The belief in this district is rather general that a gradual improvement in steel buying will become evident now that political issues have been settled for the time being.

The particular concern of producers is the maintenance of prices in the face of the extremely low volume of steel buying. In view of Coordinator Richberg's statement in October in favor of price stabilization, it is believed that there will be no immediate digression from that favorable Federal attitude.

Aggregate steel buying in this district in the first week in November reflects very little, if any, improvement. Sheet demand has expanded slightly, but in practically all other classes of steel consumer covering has been spotty. Automotive tonnage reaching this district has not yet been significant, but producers here are hopeful that this class of buying will expand noticeably by Nov. 15.

A fair share of the prospective Norfolk & Western rail requirements of 10,000 tons will probably be placed in this district. Brisker activity is noticeable in the plate and shape market, largely owing to increased barge inquiry. The Navy bids on about 3000 tons of plates, which were opened on Nov. 2, are being tabulated and mills in this district may benefit moderately from this business. Tin plate production is headed downward, with output this week at about 37 per cent of capacity.

Steel ingot output in the Pittsburgh district is unchanged at 18 per cent of capacity. Increased automotive releases have accounted for a four-point advance to 26 per cent production in the Valleys and nearby northern Ohio mills. Production in the Wheeling district is likewise higher at 36 per cent.

Pig Iron

Small-lot orders from gray iron foundries have increased moderately. The market generally is quiet, however, with purchases largely on a spot basis. Large basic and Bessemer consumers are still out of the market and offer no indication of buying heavily during the remainder of the quarter. Demand from steel foundries is very limited.

Semi-Finished Steel

Although aggregate demand is still restricted, takings by detached mills are fairly regular. In the case of shipments to sheet and strip mills the movement points upward. Declining tin plate output is having an adverse effect on sheet bar demand.

Rails and Track Accessories

No important inquiries have been received in this district in the past week. Interest is naturally centered in the Norfolk & Western inquiry for 10,000 tons of 131-lb. rails, which closes on Nov. 14. A fair quantity of railroad track spikes and tie plates is included in the inquiry.

Bars

Spot buying still predominates in this market. Significant automotive tonnage has not yet appeared, nor is demand from other major sources encouraging at the moment. A slight pickup is noted in demand from farm implement makers. In the reinforcing bar market private work is almost wholly eclipsed by public works projects. Rail steel will be used for the Tygart Valley dam, for which Frederick Snare Corpn., New York, holds the general contract. A fair quantity of billet steel reinforcing will be required for a bridge at West Leechburg, Pa.

Cold-Finished Steel Bars

Motor car makers have not yet expanded their requirements noticeably, but the long awaited placing of orders for next year's models is expected to materialize by the middle of November. Miscellaneous consuming lines are restricting purchases to small lots, while the aggregate movement to major outlets is far from encouraging.

Bolts, Nuts and Rivets

While shading is reported on the present bolt and nut discounts of 70, 10, 10 and 10 off list, most producers are avoiding the offering of concessions. The recent unsettlement in prices has tended to depress consumer interest, which already had been at a low point prior to the price reductions.

Tubular Products

Demand for various classes of pipe shows little variation from week to week. A fairly regular, though moderate, movement of oil country goods continues. With stabilization of oil and gasoline prices practically a foregone conclusion, prospects for renewed drilling activity brighten the outlook for oil country goods. Shipments of standard pipe are tending slightly higher as a result of the Federal home rehabilitation program. A lack of private building construction, however, is holding standard pipe business to an abnormally low level. Mechanical tubing is in poor demand. Effective Nov. 10 a price of 8.75c., Pittsburgh, will apply to cold-drawn seamless round automotive tubing (front axle tubes S.A.E. No. 4100 series, open hearth.) The size range of this tubing will be 1½ in. o.d. to 3 in. o.d. inclusive, with walls not lighter than 0.148 in.

Wire Products

A small gain is reported in demand for manufacturers' wire for automotive consumption. Interest in spring wire is likewise greater, but has not been translated into significant orders. Demands from agricultural regions are rather spotty, with mills in this district benefiting only to a limited degree. Operations show little change from a fortnight ago, with the average probably around 20 to 25 per cent.

Strip Steel

This market is marking time, pending expected placement of large automotive tonnages. Miscellaneous demand shows no trend, while the movement to other important consuming quarters is likewise drifting. Prices appear to be very steady.

Coke and Coal

With mild weather prevailing, demand for domestic-sized fuels has received a setback. No encouraging features are evident in this market, with the movement of steam coal in keeping with the reduced industrial activity in this district. Accumulations of slack are mounting, and producers see no early prospect of moving substantial tonnages of this grade so late in the Lake navigation season. Spot business predominates in the foundry and furnace coke markets.

Plates and Shapes

Broader activity in the steel barge market has stimulated demand for plates and shapes. The West Kentucky Coal Co., Paducah, Ky., is in-

quiring for five, seven or 10 coal barges, estimated to require about 1100 tons of plates and 500 tons of shapes. The Commonwealth Edison Co. subsidiaries are tentatively interested in 24 coal barges, which would require about 3000 tons of plates and 1100 tons of shapes. The Campbell Transportation Co., Pittsburgh, has taken bids on eight coal barges and five down-river type barges, requiring 1900 tons of plates and shapes, and is expected to take action this week. Structural steel awards and inquiries in the past week have been relatively light.

Sheets

Improved demand for common black sheets from drum and barrel manufacturers and slightly heavier calls for full finished sheets from automotive centers have enabled sheet mills to accelerate rolling schedules. In fact, heavier volume late last week accounted for an unexpected rise in output to about 30 per cent of capacity, at which rate the sheet industry will likely operate during the current week. Automotive tonnage placed thus far in November, however, is not considered significant, and sheet producers are now pinning hopes on substantial buying of auto body sheets by the middle of this month. Miscellaneous demand is holding its own, but prospects for any marked improvement during fourth quarter are vague.

Tin Plate

Production has dipped three points this week to about 37 per cent of capacity. With most consumers liquidating stocks so far as possible, pending announcement of the 1935 price late this month, further recession in output is believed to be likely. Specifications for the Government meat pack have temporarily subsided.

Scrap

A round tonnage of No. 1 heavy melting steel has been purchased at $10.75, delivered. Brokers have been offering $10.25 to $10.50 to cover on the order with very little tonnage now available at the lower price. The market for No. 1 steel is considered firm at the present quotational spread of $10.25 to $10.75, and a further round lot purchase would probably force the price higher in view of the reluctance of yard dealers to release scrap freely at present values. At the moment, however, there is very little actual consumer demand to justify a definitely bullish sentiment. Bids are being taken by the Pennsylvania Railroad on about 21,000 tons of scrap, including 6550 tons of No. 1 steel. The Baltimore & Ohio list covers about 5000 tons, of which only 900 tons is No. 1 steel.

Export Scrap Prices Advance at Boston

BOSTON, Nov. 7.—The export scrap market continues active. Two boats are loading here this week, and another will start loading next week. Prices paid for export scrap have been lifted 25c. to 50c. to $6.75 to $7 a ton delivered alongside here, due to competition between two exporters for material. A sizable portion of a cargo going to Scotland will be motor blocks and, with barge shipments due to move next month to New Jersey pipe manufacturers, the surplus stock of such scrap will be materially reduced. With the American Steel & Wire Co., Worcester, Mass., not meeting the export price, a sizable tonnage of scrap in that district has been moved to and through Boston. The market for domestic delivery continues flat and brokers see little indication of business improvement during the remainder of this year.

Pig iron sales are light, with average takings ranging from 10 to 50 tons, delivered by truck. There are no open inquiries of importance. General business conditions so far as they relate to the steel and allied industries are a little better than a month ago, although the New England melt of iron is still comparatively small.

Federal Projects Are Feature on Coast

SAN FRANCISCO, Nov. 5. — The Northwest again became the center of interest on the Coast when bids were called on two major Federal contracts, one on the Owyhee project and the other at Fort Peck dam. Bids on the Owyhee job will be opened Nov. 26 at Ontario, Ore., and cover the construction of the Malheur River and Dead Ox siphons. The former calls for the furnishing and erecting of 22,000 ft. of 80-in. welded steel pipe, while the latter is for 720 ft. of 70-in. pipe. Although the Owyhee specifications have not yet been issued, preliminary estimates place steel requirements at 4835 to 6043 tons of plates and structural steel and 180 tons of reinforcing bars. Should the precast concrete pipe alternate be accepted, the plate and structural requirements will be reduced to 385 to 481 tons and the reinforcing bar tonnage increased to 4000 tons.

At Kansas City, Mo., the United States Engineers rejected bids for the Fort Peck dam spillway and new bids will be opened Nov. 12. The 7000 ft. of channels and cut-off structure call for the furnishing and placing of 18,000 tons of reinforcing bars, 722 tons steel sealing strips and 130,500 ft. of 6 to 18-in. pipe drains.

The Metropolitan Water District is opening bids at Los Angeles the latter part of the week for tunnel ribs calling for 1040 to 1600 tons of structural steel. Awards of general contracts are expected shortly for the construction of the second unit of the Colorado River project.

American Bridge Co. booked four bridges in New Mexico which call for 1107 tons of structural steel. Pacific Coast Steel Corpn. will furnish 350 tons of structural steel for alterations to two schools in Southern California. Bar, plate and cast iron pipe awards during the past week have been limited.

Activity in Central California is restricted, with a decrease being noted even among jobs requiring minor tonnages. Work in the Northwest is limited largely to Federal projects. Southern California appears to be the bright spot on the Coast, with a number of school, municipal and county projects under consideration. The number of projects, as well as the tonnage requirements, have increased in this territory during the past 60 days. Jobbing business in particular has shown favorable gains.

Scrap Weakens At St. Louis

ST. LOUIS, Nov. 7.—State and Federal awards and pending projects are features of the market. The Kansas City Structural Steel Co. has been awarded 1200 tons of structural steel for a viaduct, the St. Joseph Structural Steel Co. has received 260 tons for a highway bridge, and Mississippi Valley Structural Steel Co. has taken 200 tons for a viaduct here. The general contract for 1205 tons of structural steel for two bridges in Oklahoma went to M. E. Gillioz of Monett, Mo. New projects include a dam at Canton, Mo., requiring 1200 tons of reinforcing bars, and one at Winona, Minn., calling for 800 tons of structural steel and 300 tons of reinforcing bars.

Demand for finished steel has been a little more active on most items, although there has been no marked pick-up in any product. There has been an increasing call for sheets and plates for the storage of low-priced gasoline.

Lack of scrap orders has caused declines of 50c. a ton for No. 2 heavy melting steel and cast iron carwheels and 25c. for miscellaneous standard-section rails, but a demand for steel car axles in the Chicago market has caused dealers here to raise their prices 50c. a ton. Dealers believe that mills will come into the market for scrap this month. A list of 3500 tons of scrap of the Missouri-Kansas-Texas Railroad is said to have been sold for export.

Fill-in orders of pig iron, principally for the stove and heating appliance trade, occupy the attention of makers.

Chicago Steel Bookings Show Slight Improvement

Ingot Rate However Is Unchanged at 30 Per Cent—Western Railroad to Buy 10,000 Tons of Rails—Scrap Moves to Lake Erie

CHICAGO, Nov. 7.—The steel market appears once again to have improved more in sentiment than in actual orders. Ingot output remains at 30 per cent of capacity as the week starts, though late last week the rate rose a point or two above that level. New specifications for finished steel are the best in 10 weeks, but the margin is small. Producers expect shipments to gain moderately in the next few days.

Railroads are holding the center of the news spot light, though their moves are more interesting because of their character rather than because of the steel tonnage they will yield. Except for one Western railroad, which is on the verge of placing 10,000 tons of rails, most of the current and prospective business from the carriers is restricted to special equipment. The Illinois Central has ordered a five-car high-speed Diesel-electric train and is now arranging the last details on orders for 11 Diesel locomotives. Western railroads in general are giving more attention to air conditioning and winter programs in this field are expected to be heavy.

Demand for sheets and bars has improved largely because of the heavier requirements of automobile manufacturers. Current demand for sheets for gutters and downspouts growing out of the home modernization program is being satisfied for the most part from stocks now held by the manufacturers of these commodities.

The tone of scrap prices is better, though thus far mills have not been forced to pay higher prices for the grades that they use. For the first time in months scrap will move by boat from Chicago when a cargo of busheling and one of borings sail for Lake Erie.

Pig Iron

November shipments to date have shown no tendency to drop. Automotive foundries should take more iron as the month advances and in all probability farm implement manufacturers will start winter programs by Thanksgiving. Prices for all grades remain steady.

Sheets

Output is creeping upward and has risen five points to 50 per cent of capacity. This improvement is due almost wholly to releases by automobile manufacturers.

Cold-Rolled Strips

Production has crept up to a range of 30 to 35 per cent of capacity. While there is some increase in miscellaneous demand, the bulk of the improvement is traceable to automobile manufacturing centers.

Wire Products

The new low prices recently filed for spring wire and high-carbon spoke wire have created much speculation as to what further changes will take place in this market. The time for filing first quarter quotations is only three weeks away and consumers are giving close attention to moves that may be made at that time. In the meantime sellers are staunch in their assertions that the price structure as a whole is steady. The general level of purchases is higher, but all commitments are for nearby consumption and most of these are coming from the automobile industry. Jobbers are intent on reducing inventories as a means of improving cash positions and also to reduce taxes. Production varies from day to day but continues to range from 25 to 30 per cent of capacity.

Plates

Current shipments are confined almost wholly to the needs of fabricated structural steel shops and an occasional water tank such as the one recently ordered by Bellwood, Ill. These are unusually small and seldom require as much as 100 tons of steel, including the structural support. Railroads come into the market only for odd and small lots that are needed on short notice. The Illinois Central has arranged most of the details for the purchase of 11 Diesel locomotives and has placed with the Pullman Car & Mfg. Corpn. an order for a five-car, Diesel-electric, high-speed train that will be operated between Chicago and St. Louis.

Bars

Both the miscellaneous and the automobile trades are lending additional support to bar rolling schedules, and the promise is that automobile manufacturers will in the very near future take materially larger quantities. The outlook in farm machinery is very favorable and good winter manufacturing schedules are looked for as a certainty.

Structural Material

Inquiries and awards remain very light, but the overbalance of inquiries indicates a more active market in the near future. The stage is being set for the opening of bids on the Muscatine, Iowa, dam on Nov. 27. A dam at Sheffield, Ala., will take 800 tons of steel. Awards for the week stand at 1500 tons and fresh inquiries total 4000 tons.

Rails

At least one purchase of rails by a Western railroad is near at hand. Otherwise demand is sluggish. Accessory orders are very light.

Cast Iron Pipe

Current orders range from one to two carloads. However, attractive tonnages are in the making for the Milwaukee filter plant and the Sanitary District, Chicago. Shipments are steady, as pipe laying is being rushed before the arrival of cold weather. Orders for future delivery are scarce.

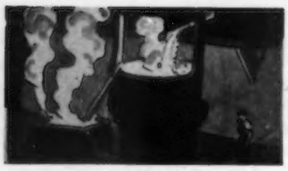
Reinforcing Bars

So far as immediate business is concerned the reinforcing bar market is drab. The number of sales is relatively high, but the value per sale is about as low as the industry has ever experienced. On orders of this kind service from the warehouse is of prime importance. The Fort Peck, Mont., job, requiring 18,000 tons, is again active and bidding will close Nov. 12. The Milwaukee filter plant, requiring 4000 tons, will be closed to bidding on Nov. 14. A small tonnage will be ordered by Chicago for another school, and the Post Office Department is having plans prepared for a number of postal sub-stations in Chicago. Bar orders for small post offices are of daily occurrence.

Scrap

Attempts on the part of a few to bull this market have had no effect and as a result mills have not paid over $9 a gross ton, delivered, for heavy melting steel, while dealers with old orders are paying $9.50 and over to the railroads in their efforts to cover. On the whole, the price structure has a fair degree of strength and most brokers are of the belief that prices are destined to move upward. Two cargoes of scrap are scheduled to leave Chicago docks in a week or ten days.

Output Fractionally Lower In Philadelphia District



Autobody Fabricators Are Delivering New Models — Outlook for Shapes Is Discouraging—Scrap Maintains Strong Tone

PHILADELPHIA, Nov. 7.—Purchases of steel in this area continue to be highly miscellaneous in character with no consuming line standing out as active. As the outlook for the remainder of the quarter is not very hopeful, the intention of mills is to keep production down to the lowest point consistent with the necessity of supplying the prompt demands of their active customers.

Ingot production has suffered a slight reduction as a reflection of lighter schedules at one plant of the major producer of this district and staggered operation at Pencoyd. Improvement in other directions is sufficient to take up most of this slack, and the aggregate district output continues at nearly 24 per cent of capacity, where it stood last week. Rolling schedules of the smaller independent mills are, on the average, of sufficient proportions to take care of current open-hearth production, but they are not heavy enough to justify the lighting of additional furnaces. At Pencoyd a large structural mill has been taken off and the small mill is now working only single turns.

Sellers of bolts and nuts are enjoying a moderate consumer demand, although the value of current business to the mills is somewhat doubtful. Several weeks ago business was offered at a discount of 70 and three tens, but more recently orders were taken at 70 and four tens off list. Many possible buyers are withholding commitments in the hope that further weakness may develop. It is believed that considerable purchasing for stock may take place when the price appears to steady.

Sheet sellers are looking forward to the entrance of local autobody stamping plants into the market soon. The largest maker is quite busy with new model production and rumor has it that a sizable buy will be made within 10 days.

Pig Iron

Melters are keeping their inventories as low as possible, and current business consequently is still characterized by quick shipments of lots of carloads to 200 tons. No user is interested in large commitments as there is little expectation of price advances on Dec. 1. On the contrary there is always the possibility that some maker may break the market in an effort to attract business in his direction. General foundry business in this area is being handled on the average by two to three working days a week. The trade believes a pick-up may appear before the end of the year, but there is nothing in the picture now to indicate that it will be of any real importance.

Bars, Plates and Shapes

In the structural field, the only activity of recent date is the awarding to Belmont Iron Works of about 750 tons of shapes, track channels and checkered plates for the high-speed approach to the Philadelphia-Camden bridge. Steel concerns will probably receive this tonnage in dribbles over the next three months. No disposition of the rails or rolling equipment has yet been made. The 1250-ton State bridge at Leechburg, Pa., was awarded to a Pittsburgh contractor who will probably buy in that district. A State power house at Elmira, N. Y., will take 320 tons, and American Bridge Co. is expected to supply the material although no contracts have yet been signed. It is reported that Pennsylvania will hold up many of its highway projects until the new Democratic Administration takes charge early in 1935. The plate business here is even less encouraging than shapes. No announcement has come from Washington as to the award of Navy steel on which bids were opened Nov. 2. As all the tenders were the same, another lot drawing is expected by the trade.

Sheets

Of paramount importance is the intention of the two large autobody stamping plants to purchase sheets in good quantities in the next 10 to 60 days. Several lots have already been taken, and as the output on new models is increased, the flow of business to the mills will probably reach good proportions. The Heintz plant will soon start on front assemblies and fenders for Willys-Overland and on various parts of Chrysler and Auburn. At present the Budd plant is turning out 3500 Ford commercial body units a week and has begun shipment on new Studebaker models. Production of Chrysler parts will be started next week. Other sheet consumers are taking almost no tonnage. The stove concerns are entering occasional orders, but the volume is considerably under that of a month ago.

Imports

The following iron and steel imports were received here last week: 5022 tons of chrome ore and 15 tons of manganese ore from Cuba; 334 tons of pig iron from British India; 68 tons of steel bands, 42 tons of structural shapes, 9 tons of steel bars and 7 tons of steel squares from Belgium; 38 tons of steel tubes, 15 tons of steel bars, 8 tons of steel forgings and 6 tons of bar iron from Sweden, and 1 ton of ferrotitanium from England.

Scrap

No new domestic business of any note has appeared in the market, but No. 1 and No. 2 heavy melting steel are maintained at $10 and $8.75 a ton respectively on the strength of transactions a week earlier. At least two sales of heavy breakable cast have advanced the price to $10, and a fair quantity of couplers and knuckles was recently delivered at $13.50. The Pencoyd mill is not expected to buy until early December, Phoenixville is only mildly interested in new commitments, and Bethlehem is picking up small quantities of No. 1 and No. 2 steel in the Baltimore and Washington area. This latter mill continues to pay about 25c. under the brokers' export price. Foreign mills continue to take excess scrap from this district. A boat has just left Baltimore and another is expected in shortly. Two boats are now loading steel at unchanged price levels at Port Richmond for Japan.

Henry J. Linn Co., 250 Stuart Street, Boston, has been appointed New England sales agent for Globe Steel Tubes Co., manufacturer of seamless steel tubular products, including mechanical tubing, boiler tubes, condenser tubes and stainless steel tubing.

International Nickel Co., Inc., moved on Nov. 1 into larger quarters in the General Motors Building, Detroit. The office was established at Detroit in 1929 to serve the automotive, aeronautical, machine tool and agricultural machinery manufacturers in Michigan, Ohio, Illinois, Indiana and Wisconsin.

Link-Belt Co., Chicago, has purchased physical assets of Bailey-Burruss Mfg. Co., Atlanta, Ga. All divisions of Link-Belt Atlanta sales office, heretofore located in Hass-Howell Building, are being moved to the Bailey-Burruss plant, which henceforth will be known as Atlanta plant of Link-Belt Co. Combined operations will be headed by I. H. Barbee, who is being transferred from Philadelphia plant of the company.

Further Rise in Operations In Cleveland-Lorain Area

Steel Rate Up Two Points to 39 Per Cent, Mainly on Increased Automotive Purchases—Pig Iron Buying Heavier

CLEVELAND, Nov. 7.—The automotive industry has placed some additional orders for sheets, bars and strip and with this business the improvement reported a week ago is being maintained. Purchases of sheets for November shipment by some of the automobile manufacturers have been supplemented by orders for early December delivery. Good tonnages in spring and bumper steel for some of the automobile parts manufacturers are now pending.

The feeling is rather general that with election over there will be some improvement in the general business situation. Ingot output in the Cleveland-Lorain territory again increased this week, being advanced two points to 39 per cent of capacity by the starting up of another open-hearth furnace by the Corrigan, McKinney Steel Co., which also has put on another blast furnace, now operating two out of four stacks.

Metal-working industries outside of the automotive field are ordering steel in small lots. The demand from these sources shows little, if any, gain, although some of the steel barrel manufacturers have cleaned up their large inventories and are again ordering steel and there is some revival in the demand for sheets from fabricators of building material who build up stocks in the winter for the spring trade. Activity in the building field continues light and the only business that is coming from the railroads is in small lots for repair work.

The city of Cleveland will take bids shortly for two miles, or about 500 tons, of 5-in. steel or cast iron pipe.

Pig Iron

Renewed activity in the automotive industry has stimulated the demand and brought out larger orders than recently. Sales during the week included three sizable lots, one of 1000, and two of 600 and 500 tons. New business has come both from automobile manufacturers and from foundries specializing on automobile castings. Several small orders for Southern foundry iron were placed during the week by jobbing foundries, representing the first activity of the kind in this territory for several months and indicating that foundries are getting to the bottom of their stock piles. Furnaces will file first quarter prices this month. No change from present quotations is looked for.

Bars, Plates and Shapes

Demand for bars shows a moderate increase, the gain being largely due to the placing of business by the automotive industry. While orders from this source are more numerous they are for small lots. Forge shops in this territory are getting busier on automobile forgings and are ordering bars. The local bar mills are scheduled to maintain operating schedules of 30 to 40 per cent of capacity this week. Structural steel awards and inquiries are light. Cleveland has inquiries out for construction work requiring 550 tons of reinforcing bars and steel piling. The Big Four railroad has placed 130 tons of shapes for a bridge in Springfield.

Sheets

Some additional orders have come from the automotive industry, part of the new tonnage being for early December shipment. Orders for sizable lots were placed during the week by two steel barrel manufacturers. This industry has been practically out of the market since it put in large stocks last June, but now seems to be getting its inventory used up. Some good orders also came from jobbers who fabricate roofing and other building material for stock. Enameling sheets continue in fair demand. Toy makers are buying freely.

Strip Steel

While some additional fair-sized lots have come from automobile manufacturers, the gain in activity in strip is not so pronounced as in sheets. Additional releases of small tonnages have come from General Motors parts plants. Little business is coming from stamping plants in this territory, which so far have not taken much new automotive work.

Iron Ore

Shipments by water during October were 2,640,823 tons, a decrease of 1,901,687 tons as compared with the same month last year. Shipments this season have exceed the 1933 movement, being 21,765,409 tons until Nov. 1, as compared with 21,672,410 tons during the whole shipping season last year. Little ore will be shipped this month.

Scrap

Foundries in this territory are buying cast scrap more freely than for some time. Steel-making and blast furnace grades remain inactive. Dealers continue to buy small lots of the former to fill outstanding orders for delivery to Youngstown district mills. The market has a firm tone and ruling prices are not bringing out much scrap. The trade believes that some mills will have to make fresh purchases shortly and this has created a more optimistic feeling. November lists of the automobile manufacturers are quite small. Quotations are unchanged but for local delivery are nominal.

Automotive Orders Up At Cincinnati

CINCINNATI, Nov. 7.—A slight improvement in automobile specifications has pushed sheet steel demand up to about 35 per cent of capacity. Orders generally continue to reflect a broad demand, but no distinctive trend is manifest.

Demand for pig iron is restricted to small orders for current needs. Melters' inventories are being held to low levels and there is no speculative buying. Foundry melt fluctuates within narrow limits at a low average, with stove foundries reporting seasonally good operations. Prices are steady and inquiry is nil.

Steel jobbers report October demand to have been about equal to September in quantity of material moved. Total number of orders, however, was sharply in excess of the September level. Current business is largely industrial. Prices are firm.

Despite lack of trading in scrap, the district market has a stronger undertone, largely as a result of improved sentiment in nearby areas. New business is small and infrequent. Speculative activity is nil as yard owners seek an outlet for substantial stocks.

Carnegie Orders Wide Hot Strip Mill

THE Carnegie Steel Co., Pittsburgh, has placed an order with the United Engineering & Foundry Co., Pittsburgh, for a 42-in. continuous hot strip mill to be installed at the former company's MacDonald, Ohio, works. Building contracts have not yet been let, but construction of the mill will begin immediately. The mill will produce both coiled and flat stock.

Structural Work Looms Large at New York

Federal Building May Take 28,000 Tons of Steel — Private Plant Construction Contemplated — Large Export Order for Flat Rolled Steel

NEW YORK, Nov. 7.—The taking of bids Nov. 9 on the new local Federal Building brings an unusually large tonnage before the trade. If maximum quantities are specified close to 28,000 tons of steel will be bought. Estimates place the structural steel at 18,000 to 19,000 tons, the reinforcing steel at 1200 to 2000 tons, the sheet steel piling at 1200 to 1800 tons, the pipe piles at 5000 tons and the merchant pipe at 200 tons.

Bids on pier shed No. 45 for the Hudson River will be taken by the Docks Department of the City of New York in two or three weeks. About 3000 tons of structural steel will be required. Bids will also be taken soon on the New York approach to the Midtown Hudson tunnel. Estimates of the quantities of materials required are now being completed. The Bendix Aviation Corpn. plans to erect a plant at Newark, and the Chrysler Corpn. and the Ford Motor Co. will construct assembly plants at Baltimore and Norfolk respectively. Plans are not yet out on these projects. A fair number of tank orders, individually rather small but sizable in the aggregate, have recently been placed by oil companies.

Orders against contracts for material for naval vessels to be built by private yards are beginning to reach mills. For destroyers and submarines to be constructed in navy yards, the navy department took bids on 4000 tons of steel Nov. 2 and will take tenders on 4100 tons additional Nov. 16. Tenders will be asked on materials for cruisers to be built in navy yards as soon as details of design are completed.

The Lehigh Valley will receive figures Nov. 9 on 250 50-ft. gondola cars.

Export trade has been enlivened by the purchase of close to 5000 tons of sheets and strip steel by the Amtorg Trading Corpn. A South American country has bought 2500 tons of light rails.

Miscellaneous steel specifications in this district are holding recent gains but have shown no further expansion.

Pig Iron

Less than two months remain to deliver against current contracts and current business is spotty and of a carlot character. This condition is furthered by the disinclination of users to stock iron with inventory taking in the offing. Only 1200 tons of fresh business was placed during the past seven-day period, as compared with 1400 tons in the previous week and 2000 tons booked two weeks earlier. There are indications that general foundry melt in this area is substantially better than two months ago. However, many concerns have not found it necessary to expand their purchases as they are still liquidating stocks taken earlier in the year. When first quarter prices are announced, it is probable that considerable business will develop for early 1934 delivery as melters are desirous of filling up holes in their stocks.

Reinforcing Steel

The 650 tons of bars required by the Hart's Island piers of the Tri-Borough Bridge, New York, was placed with Capital Steel Co. and Igoe Brothers. In addition, over 200 tons of mesh for a highway project in St. Lawrence County, N. Y., was awarded to Truscon Steel Co. Otherwise the reinforcing steel market in this district has been particularly quiet with only a moderate flow of miscellaneous small orders engaging the attention of distributers. Pending projects are not very encouraging in volume. New Jersey is releasing some small tonnages for highway construction, and New York State has let the general contracts on three projects which will require an aggregate of about 600 tons of mesh. The contractors are expected to place this tonnage within a fortnight.

Scrap

Moderate quantities of stove plate are being loaded on barge at $6 a ton, New York, for delivery to Bayonne, N. J., and occasional carlots of other grades are leaving North Jersey points for eastern Pennsylvania mills and foundries. However, in the absence of general domestic business, brokers here are still devoting their attention to the active export market. The usual consuming countries are delaying the placing of more orders. England is slightly more desirous of various grades of scrap, but buyers there are none too willing to meet the firm prices which prevail here. Three boats are now loading, one apiece for Japan and Italy with steel, and one for England with steel and cast grades. Brokers' prices on barge of No. 1 and No. 2 steels are unchanged, but unprepared yard iron and steel have strengthened to $4 a ton.

Pig Iron Demand Improves at Buffalo

BUFFALO, Nov. 7.—Pig iron melters are buying more freely, but orders are for fill-in tonnage, since no first quarter purchasing is possible until Dec. 1. Boiler and radiation companies are more active. October commitments of pig iron producers were above those of September.

Bethlehem's Lackawanna plant continues to operate six open-hearths, and Republic Steel Corpn., three. The Seneca sheet division of Bethlehem is running at about 15 to 20 per cent.

Bids on a new local police headquarters, to require 600 tons of fabricated structural material, will be taken Nov. 8. A bridge in Allegany County requiring 130 tons is understood to have been awarded to a Buffalo fabricator, but this is not confirmed. Another local fabricator has the contract for 125 tons for a bridge at Irving, N. Y.

The scrap market is quiet except that a sale of stove plate at $8.75 and of No. 1 machinery cast at $9.50 is reported. It is said that about 1500 or 2000 tons was involved.

Better Sheet and Wire Demand in South

BIRMINGHAM, Nov. 7.—Pig iron buying is still limited mostly to spot orders. Furnace operations remain as they have been since Oct. 18, with four stacks active.

A gradual improvement has been noticeable the last two or three weeks in the demand for sheets and wire products. The impetus has come from the rural markets. The upward trend, though, has not been particularly marked.

Six open-hearth units were worked in the South last week and the same schedule will be followed this week.

Shipment was made last week of two carloads of steel castings for slide gates at the Norris Dam. Other shipments will go forward from time to time.

Pressure pipe has had two fairly good months, and November will likely be as good as September and October.

Fabricated Structural Steel

Awards Again Decline—New Projects Also Lower

WITH no letting exceeding 800 tons, structural steel bookings totaled only 7550 tons, compared with 7900 tons a week ago. New projects of 7000 tons are among the lowest for the year. The only sizable inquiry is 1040 to 1600 tons for tunnel ribs for the Metropolitan Water District at Los Angeles. Plate awards total 1160 tons, with more than 13,000 tons pending. Sheet steel piling inquiries for dams on the Mississippi and Ohio rivers call for about 5000 tons. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

New York, 740 tons, apartment house at 231 East Seventy-third Street, to Harris Structural Steel Co.

New York, 160 tons, immigration building on Ellis Island, to Lehigh Structural Steel Co.

New York, 210 tons, destructor plant in Queens, to American Bridge Co.

Brooklyn, N. Y., 185 tons, Cascade Laundry addition, to Reiche & Penner, Brooklyn.

Binghampton, N. Y., 260 tons, repairs to highway bridges, to Lackawanna Steel Construction Co.

Maspeth, L. I., 140 tons, destructor plant, to American Bridge Co.

Greene County, N. Y., 115 tons, highway bridge, to Lackawanna Steel Construction Corpn.

Elmira, N. Y., 330 tons, power house, to American Bridge Co.

Allegany County, N. Y., 130 tons, highway bridge, to Lackawanna Steel Construction Corpn.

Philadelphia, 790 tons, trackwork and rail for high-speed approach to Camden bridge, to Belmont Iron Works.

Irving, N. Y., 125 tons, highway bridge, to R. S. McMannus Steel Construction Co.

Hampton, N. J., 250 tons, highway bridge, to Phoenix Bridge Co.

THE SOUTH

Handley-Marmet, W. Va., 310 tons, bulkhead storage bridges, to Virginia Bridge & Iron Co.

Carthage, Tenn., 750 tons, Cumberland River Bridge, to Vincennes Bridge Co.

Canton, Ga., 150 tons, State highway bridge, to American Bridge Co.

Miami, Fla., 180 tons, highway bridge, to McClintic-Marshall Corpn.

CENTRAL STATES

Springfield Ohio, 135 tons, bridge, to Mount Vernon Bridge Co.

Waverly, Ohio, 150 tons, highway bridge, to Burger Iron Co.

Milwaukee, 240 tons, Shorewood High School, to an unnamed bidder; previously reported to William F. Eichfeld & Sons Co.

Augusta, Wis., 315 tons, State highway bridge, to McClintic-Marshall Corpn.

Lynxville, Wis., 150 tons, State highway bridge, to Fort Pitt Bridge Works Co.

State of Minnesota, 200 tons, bridges, to Minneapolis-Moline Power Implement Co.

Poplar Bluffs, Mo., 150 tons, bridge, to McClintic-Marshall Corpn.

Clay County, Kan., 360 tons, highway bridge, to St. Joseph Structural Steel Co.

WESTERN STATES

Cascade, Colo., 640 tons, Crystal Creek dam facing for city of Colorado Springs, to American Bridge Co.

Almira, Wash., 265 tons, conveyer bridges for Grand Coulee dam, to Pacific Car & Foundry Co.

Bell, Cal., 240 tons, school alterations, to Pacific Coast Steel Corpn.

Whittier, Cal., 120 tons, Union high school alterations, to Pacific Coast Steel Corpn.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Revere, Mass., 600 tons, Point of Pines bridge.

Brooklyn, 800 tons, New York Dock Co. pier shed No. 38.

Baltimore, 300 tons, building for Crown Cork & Seal Co.

Buffalo, 650 tons, police station, previously reported as 1000 tons.

THE SOUTH

Louise, Tex., 225 tons, bridge.

CENTRAL STATES

Cleveland, 175 tons, sheet steel piling for Westerly sewage treatment plant.

Gallipolis, Ohio, 435 tons of permanent piling and about 1000 tons of temporary piling for Ohio River dam; bids Dec. 5.

Muscatine, Iowa, 2600 tons of permanent piling and about 1000 tons of temporary piling for Mississippi River dam No. 16; bids Nov. 27.

Des Moines, Iowa, 600 tons, post office.

Chicago, 200 tons, elevated railway structure; Empire Construction Co., Chicago, low bidder.

Winona, Minn., 800 tons, dam No. 5A across Mississippi River; bids Dec. 12.

State of Minnesota, 375 tons, three bridges.

Chautauqua, Kan., 500 tons, bridge.

Dorchester, Neb., 150 tons, State highway viaduct.

State of Nebraska, 520 tons, highway bridges.

WESTERN STATES

State of Colorado, 200 tons, highway bridges.

Boulder City, Nev., 300 tons, intake tower bridges for Boulder Dam.

Ogden, Utah, 300 tons, high school.

Sutter County, Cal., 122 tons, State bridge over Tisdale Weir; bids Nov. 21.

Los Angeles, 1040 to 1600 tons, tunnel ribs for Metropolitan Water District, Specification M-2030; bids Nov. 9.

FABRICATED PLATE

AWARDS

Binghamton, N. Y., 235 tons, floor plates for highway bridges, to Lackawanna Steel Construction Corpn.

Kearny and Lyndhurst, N. J., 115 tons, tanks for Independent Oil Co., to Chicago Bridge & Iron Works.

Port Arthur, Tex., 280 tons, tanks for Gulf Refining Co., to Petroleum Iron Works.

Bellwood, Ill., 100 tons, tank, to Western Gas Construction Co.

Mesa, Ariz., 175 tons, pipe line extension for Western Gas Co., to an unnamed bidder.

Upland, Cal., 112 tons, 14-in. pipe; bids rejected and material bought in open market.

Vernon, Cal., 140 tons, city storage tank, to Pacific Coast Steel Corpn.

NEW PROJECTS

Pittsburgh, 1900 tons, plates and shapes for eight coal barges and five down river type barges for Campbell Transportation Co., Pittsburgh; awards probably this week.

Paducah, Ky., 1600 tons, plates and shapes for 5, 7 or 10 coal barges for West Kentucky Coal Co.

Chicago, 4100 tons, plates and shapes, tentative inquiry for 24 coal barges for Commonwealth Edison Co. subsidiaries.

Ontario, Ore., 4835 tons or 6043 tons, Malheur River and Dead Ox siphons; bids Nov. 26.

Fort Peck, Mont., 722 tons steel sealing strips for dam spillway; new bids Nov. 12.

Steel Scrap Industry Completing Organization

WITH the approval by the NRA of the budget for the scrap iron code authority, it was announced by Benjamin Schwartz, director general of the Institute of Scrap Iron and Steel, that all of the 13 chapters of the institute will be promptly called into special meetings, for the purpose of electing local control boards, and for the purpose of putting into effect the administrative machinery approved by the NRA for the scrap iron and steel trade. The first of a series of chapter meetings was called by P. W. Bowers, president of the New York chapter of the institute, which met at the Imperial Hotel, New York, on Nov. 7.

Other chapter meetings scheduled include the following: New Jersey chapter, Nov. 12, with Frank Contey presiding; Philadelphia chapter on Nov. 14, with John Hunt presiding; Boston chapter on Nov. 15, with Joseph V. Kiley presiding. The other chapters of the institute will announce meetings, to be held during November, within a few days.

Lemoyne Steel Co. Plant Purchased

THE plant of the Lemoyne Steel Co., New Eagle, Pa., has been acquired by the recently organized Lemoyne Alloys Co., and is being reconditioned to resume operations about Jan. 1, 1935. The new company will produce tungsten and molybdenum alloys in chemical compounds under is own patents.

Joseph W. Weitzenkorn, formerly president of the Molybdenum Corporation of America, is head of the new concern.

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel	*Base per Lb.*
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
F.o.b. Duluth	1.95c.
Del'd Detroit	1.95c.
F.o.b. Cleveland	1.85c.
F.o.b. Buffalo	1.90c.
Del'd Philadelphia	2.09c.
Del'd New York	2.13c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Rail Steel
(For merchant trade)

F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Moline, Ill.	1.75c.
F.o.b. Cleveland	1.75c.
F.o.b. Buffalo	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. cars dock Gulf ports	2.10c.
F.o.b. cars dock Pacific ports	2.25c.

Billet Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Gary	2.10c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Youngstown	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
F.o.b. Gary	1.95c.
F.o.b. Cleveland	1.95c.
F.o.b. Youngstown	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Terre Haute, Ind.	1.75c.
F.o.b. Louisville, Ky.	2.10c.
F.o.b. Danville, Pa.	1.80c.
F.o.b. Berwick, Pa.	1.80c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.10c.
F.o.b. Chicago	2.15c.
F.o.b. Gary	2.15c.
F.o.b. Cleveland	2.15c.
F.o.b. Buffalo	2.20c.
Del'd Detroit	2.30c.
Del'd eastern Michigan	2.35c.

* In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts

Angle Line Posts	*Base per Net Ton*
F.o.b. Pittsburgh	$50.00
F.o.b. Chicago	50.00
F.o.b. Duluth	51.00
F.o.b. Cleveland	50.00
F.o.b. Birmingham	53.00
F.o.b. Houston	59.00
F.o.b. cars dock Pacific ports	68.00

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.985c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd Philadelphia	1.985c.
Del'd New York	2.08c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. P'gh	3.20c.

Floor Plates

F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
Del'd Cleveland	1.985c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	2.005c.
Del'd New York	2.0525c.
F.o.b. Birmingham (standard)	1.95c.
F.o.b. cars dock Gulf ports	2.25c.
F.o.b. cars dock Pacific ports	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.85c.
No. 10, f.o.b. Gary	1.95c.
No. 10, del'd Detroit	2.05c.
No. 10, del'd Phila.	2.14c.
No. 10, f.o.b. Birmingham	2.00c.
No. 10, f.o.b. dock cars Pacific ports	2.40c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Gary	2.50c.
No. 24, del'd Detroit	2.60c.
No. 24, del'd Phila.,	2.69c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, f.o.b. dock cars Pacific ports	3.05c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage, del'd Detroit	2.70c.
No. 10 gage, del'd Phila.	2.79c.
No. 10 gage, f.o.b. Birmingham	2.55c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.10c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit	3.15c.
No. 20 gage, del'd Phila.	3.24c.
No. 20 gage, f.o.b. Birmingham	3.10c.
No. 20 gage, f.o.b. dock cars Pacific ports	3.50c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	3.10c.
No. 24, f.o.b. Gary	3.20c.
No. 24, del'd Phila.	3.39c.
No. 24, f.o.b. Birmingham	3.25c.
No. 24, f.o.b. dock cars Pacific ports	3.70c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.40c.
F.o.b. cars dock Pacific ports	4.10c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock, Pacific Coast ports	3.35c.

Tin Plate *Base per Box*

Standard cokes, f.o.b. P'gh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate
(F.o.b. Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¾ In.

	Base per Lb.
All widths up to 24 in., P'gh	1.85c.
All widths up to 24 in., Chicago	1.95c.
All widths up to 24 in., del'd Detroit	2.05c.
All widths up to 24 in., Birmingham	2.00c.
Cooperage stock, Pittsburgh	2.10c.
Cooperage stock, Chicago	2.20c.

Cold-Rolled Strips

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.88c.
F.o.b. Worcester	2.80c.

Fender Stock

No. 14, Pittsburgh or Cleveland	2.90c.
No. 14, Worcester	3.30c.
No. 20, Pittsburgh or Cleveland	3.30c.
No. 20, Worcester	3.70c.

Hot-Rolled Rail Steel Strips

	Base per Lb.
F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade	*Per Lb.*
Bright wire	2.30c.
Spring wire	2.90c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester prices are $2 a ton above, and Pacific Coast prices $9 a ton above.

To Jobbing Trade

Qualified jobbers are entitled to a reduction of 20c. a 100 lb. from the base price on carload shipments to stock, and of 10c. a 100 lb. on less-carload shipments to stock.

	Base per Keg
Standard wire nails	$2.60
Smooth coated nails	2.60
Galvanized nails:	
15 gage and coarser	4.60
16 gage and finer	5.10
	Base per 100 Lb.
Annealed fence wire	$2.45
Galvanized fence wire	2.80
Polished staples	3.30
Galvanized staples	3.55
Barbed wire, galvanized	3.00
Woven wire fence, base column	63.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

On manufacturers' wire prices at Pacific ports are $9 above the Pittsburgh base. On high-carbon spring wire, prices at Pacific ports are also $9 above Pittsburgh. On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi are $6 a ton over Pittsburgh, while New Orleans and Pacific Coast prices are $8 over Pittsburgh. Exception: on fence wire Pacific Coast prices are $11 a ton above Pittsburgh.

Wire Hoops, Twisted or Welded

	Off List
F.o.b. Pittsburgh	35 and 2½ off
F.o.b. Chicago	35 off

Bale Ties, Single Loop

	Base per Net Ton
F.o.b. Pittsburgh	$63.00
F.o.b. Chicago	64.00
F.o.b. Duluth	65.00
F.o.b. Cleveland	63.00
F.o.b. Birmingham	66.00
F.o.b. cars dock Houston, Galveston, Beaumont, Orange or Corpus Christi, Tex.	72.00
F.o.b. cars dock Pacific ports	74.00

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel Inches	Black	Galv.	*Wrought Iron* Inches	Black	Galv.
⅛	....51½	29½	⅛	+91½	+138
¼ to ⅜	....53½	35	¼ & ⅜	+1½	+21½
½	....58½	47	½	....31½	15
¾	62	52	¾	....36½	20½
1 to 3	64	55	1 & 1¼	....39½	25½
			1½	....43½	28
			2	....41½	26

Lap Weld

2	60	51	2	37	22½
2½ to 3	..63	54	2½ to 3½	38	25
3½ to 6	..65	56	4 to 8	...40	28½
7 and 8	..64	54	9 to 12	..38	24½
9 and 10	..63½	53½			
11 and 12	.62½	52½			

Butt Weld, extra strong, plain ends

⅛	....48½	33½	⅛	+13	+45½
¼ to ⅜	..51	38	¼ & ⅜	+2½	+34½
½	....56½	47½	½	....32½	17½
¾	61	52	¾	....37½	22½
1 to 3	63	55	1 to 2	..43½	29

Lap Weld, extra strong, plain ends

2	58	50	2	40	26
2½ to 3	..62	54	2½ to 4	45½	33
3½ to 6	..65½	57½	4½ to 6	45	33½
7 and 8	..64½	54½	7 & 8	..46	33
9 and 10	..63½	53½	9 to 12	.41½	30
11 and 12	.62½	52½			

On standard steel pipe an extra 5% off is allowed on sales to consumers while two 5's off apply on sales to jobbers. On less-than-carload shipments prices are determined by adding 20 and 25% and the carload freight rate to the base card. On structural steel pipe the base card is reduced 2 points and two 5's off are allowed to consumers and three 5's off to jobbers.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.60	$7.82
1¼ in. o.d.	13 B.W.G.	10.19	9.26
1½ in. o.d.	13 B.W.G.	11.26	10.23
1¾ in. o.d.	13 B.W.G.	12.81	11.64
2 in. o.d.	13 B.W.G.	14.35	13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2½ in. o.d.	12 B.W.G.	19.29	17.54
2¾ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	21.45	19.50
3¼ in. o.d.	11 B.W.G.	25.22	22.93
3½ in. o.d.	11 B.W.G.	27.09	24.62
4 in. o.d.	10 B.W.G.	33.60	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.96

Extras for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5 %
10,000 lb. or ft. to 24,999 lb. or ft.	12½ %
2,000 lb. or ft. to 9,999 lb. or ft.	25 %
Under 2,000 lb. or ft.	40 %

Hot-Finished Lapweld Steel Pressure Tubes

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

1½ in. o.d.	13 B.W.G.	$ 9.72
1¾ in. o.d.	13 B.W.G.	11.04
2 in. o.d.	13 B.W.G.	12.38
2¼ in. o.d.	13 B.W.G.	13.79
2½ in. o.d.	12 B.W.G.	16.58
2¾ in. o.d.	12 B.W.G.	17.54
3 in. o.d.	12 B.W.G.	18.35
3¼ in. o.d.	11 B.W.G.	21.56
3½ in. o.d.	11 B.W.G.	23.15
4 in. o.d.	10 B.W.G.	28.66
4½ in. o.d.	10 B.W.G.	35.22
5 in. o.d.	9 B.W.G.	44.25
6 in. o.d.	7 B.W.G.	68.14

Quantity Extras:

40,000 lb. or ft.	base
25,000 lb. or ft. to 39,999 lb. or ft.	plus 5 %
10,000 lb. or ft. to 24,999 lb. or ft.	plus 12½ %
2,000 lb. or ft. to 9,999 lb. or ft.	plus 25 %
Under 2,000 lb. or ft.	plus 40 %

CHARCOAL IRON BOILER TUBES

Base Discounts, f.o.b. Pittsburgh

In. O. D.	
1½ and 1¾	44
2 —2¼	13 and 10
2½—2¾	16 and 10
3	17 and 10
3¼—3½	18 and 10
4	20 and 10
4½, 5, 6	21 and 10

Extras for quantity: For 1½ to 1¾, up 8 points under 10,000 lb., up 4 points 10,000 lb. to carload. For 2 in. to 5½ in., up 2 points without supplementary 10 per cent, under 10,000 lb.; supplementary 5 per cent instead of supplementary 10 per cent for 10,000 lb. to carload.

In sizes 2 in. to 4½ in. O.D. inclusive, all tubes more than four gages heavier than standard are priced per lb. as follows: Carload and over, 9c.; extras for quantity—under 10,000 lb. 1c. per lb., 10,000 lb. to carload ½c. per lb.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$47.00
4-in., del'd Chicago	50.00
6-in. and larger, del'd New York	45.00
4-in. del'd New York	48.00
6-in., and larger, Birmingham	39.00
4-in. Birmingham	42.00

Class "A" and gas pipe, $3 extra

RAILROAD MATERIALS

Rails and Track Supplies

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$35.00
Light rails (from rail steel) per gross ton	34.00
	Base per 100 Lb.
Spikes, 9/16 in. and larger	$2.40
Spikes, ½ in. and smaller	2.40
Spikes, boat and barge	2.40
Tie plates, steel	1.90
Track bolts, to steam railroads	3.55
Track bolts, no jobbers, all sizes (per 100 count)	70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneapa. Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va., Jersey City, N. J.

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BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine bolts .....70, 10, 10 and 10
Carriage bolts .....70, 10, 10 and 10
Lag bolts .....70, 10 10 and 10
Plow bolts, Nos. 1, 2, 3 and 7 heads .....70, 10, 10 and 10
Hot-pressed nuts, blank or tapped, square .....70, 10, 10 and 10
Hot-pressed nuts, blank or tapped, hexagons .....70, 10, 10 and 10
C.p.c. and t. square or hex. nuts, blank or tapped.....70, 10, 10 and 10
Semi-finished hexagon nuts, U.S.S. all sizes .....70, 10, 10 and 10
Semi-finished hexagon nuts, S.A.E.
¼ in. to 7/16 in. diameter 70, 10, 10 and 10
½ in. to 1 in. diameter 70, 10, 10 and 10
larger than 1 in. diameter 70, 10, 10 and 10
Stove bolts in packages, Pittsburgh.. 75
Stove bolts in packages, Chicago..... 75
Stove bolts in packages, Cleveland.... 75
Stove bolts in bulk, P'gh..... 83
Stove bolts in bulk, Chicago..... 83
Stove bolts in bulk, Cleveland..... 83
Tire bolts .....60 and 10

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland.....$2.90
F.o.b. Chicago 3.00
F.o.b. Birmingham 3.05

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh .....70 and 5
F.o.b. Cleveland .....70 and 5
F.o.b. Chicago and Birm'g'm....70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller 85
Milled standard set screws, case hardened, 1 in. dia. and smaller...75 and 10
Milled headless set screws, cut thread ⅝ in. and smaller.....75 and 10
Upset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller .....85 and 10
Upset set screws, cut and oval point... 80
Milled studs .....65 and 10

Alloy and Stainless Steel

Alloy Steel Ingots

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Uncropped.....$40 per gross ton

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $49 a gross ton.
Price del'd Detroit is $52.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base.....2.45c.
Delivered price at Detroit is.....2.60c.
S.A.E.

Series Numbers	Alloy Differential per 100 lb.
2000 (½% Nickel)	$0.25
2100 (1¼% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4800 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 2.95c. base per lb.

STAINLESS STEEL No. 302

(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C)

(Base Prices, f.o.b. Pittsburgh)

Per Lb.

Bars ..... 23c.
Plates ..... 26c.
Sheets ..... 33c.
Hot-rolled strip .....20½c.
Cold-rolled strip ..... 27c.

Raw and Semi-Finished Steel

Carbon Steel Rerolling Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.
Uncropped.....$29 per gross ton

Carbon Steel Forging Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Birmingham.
Uncropped.....$31 per gross ton

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.

Per Gross Ton

Rerolling $27.00
Forging quality 32.00

Delivered Detroit

Rerolling $30.00
Forging 35.00

Billets Only F.o.b. Duluth

Rerolling $29.00
Forging 34.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or Bessemer.....$28.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved ..... 1.70c.
Universal ..... 1.70c.
Sheared ..... 1.70c.

Tube Rounds

Base per Lb.

F.o.b. Pittsburgh ..... 1.80c.
F.o.b. Chicago ..... 1.85c.
F.o.b. Cleveland ..... 1.85c.
F.o.b. Buffalo ..... 1.90c.
F.o.b. Birmingham ..... 1.95c.

Wire Rods

(Common soft, base)

Per Gross Ton

F.o.b. Pittsburgh $38.00
F.o.b. Cleveland 38.00
F.o.b. Chicago 39.00
F.o.b. Anderson, Ind. 39.00
F.o.b. Youngstown 39.00
F.o.b. Worcester, Mass. 40.00
F.o.b. Birmingham 41.00
F.o.b. San Francisco 47.00

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Pig Iron and Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	$19.50	$20.00	$19.00	$20.50
Bethlehem, Pa.	19.50	20.00	19.00	20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Swedeland, Pa.	19.50	20.00	19.00	20.50
Steelton, Pa.	.....	.....	19.00	.....
Sparrows Point, Md.	19.50	.....	19.00	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Youngstown	18.50	18.50	18.00	19.00
Buffalo	18.50	19.00	17.50	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Cleveland	18.50	18.50	18.00	19.00
Toledo, Ohio	18.50	18.50	18.00	19.00
Jackson, Ohio	20.25	20.25	19.75	.....
Detroit	18.50	18.50	18.00	19.00
Hamilton, Ohio	18.50	18.50	18.00	19.00
Chicago	18.50	18.50	18.00	19.00
Granite City, Ill.	18.50	18.50	18.00	.....
Duluth, Minn.	19.00	19.00	.....	19.50
Birmingham	14.50	14.50	13.50	19.00
Provo, Utah	17.50	.....	.....	.....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District				
From Everett, Mass.	$20.00	$20.50	$19.50	$21.00
Brooklyn				
From East Pa. or Buffalo	21.77	22.27	21.27	22.77
Newark or Jersey City, N. J.				
From East. Pa. or Buffalo	20.89	21.39	20.39	21.89
Philadelphia				
From Eastern Pa.	20.26	20.76	19.76	21.26
Cincinnati				
From Hamilton, Ohio	19.51	19.51	19.01	20.01
Canton, Ohio				
From Cleveland and Youngstown	19.76	19.76	19.26	20.26
Columbus, Ohio				
From Hamilton, Ohio	20.50	20.50	.....	.....
Mansfield, Ohio				
From Cleveland and Toledo	20.26	20.26	.....	.....
Indianapolis				
From Hamilton, Ohio	20.77	20.77	.....	.....
South Bend, Ind.				
From Chicago	20.55	20.55	.....	.....
Milwaukee				
From Chicago	19.50	19.50	.....	.....
St. Paul				
From Duluth	20.94	.....	.....	.....
Davenport, Iowa				
From Chicago	20.26	20.26	.....	.....
Kansas City				
From Granite City	21.04	21.04	.....	.....

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.....$23.50
Johnson City, Tenn. 23.50
Del'd Chicago 29.15
Johnson City, Tenn. (off grade).. 19.50

GRAY FORGE PIG IRON

Valley furnace $18.00
Pittsburgh district furnace 18.00

CHARCOAL PIG IRON

Lake Superior furnace $21.00
Delivered Chicago 24.04
Delivered Buffalo 24.28

CANADA

Pig Iron

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75.....$21.00
No. 2 fdy., sil. 1.75 to 2.75..... 20.50
Malleable 21.00

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75.....$22.50
No. 2 fdy., sil. 1.75 to 2.25..... 22.00
Malleable 22.50
Basic 22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload) $85.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads) $77.50
50% (ton lots) 85.00
75% (carloads) 126.00
75% (ton lots) 136.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads) (duty paid).... 31.00
14% to 16% (less carloads)..... 38.50

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$22.75	12%	$29.25
7%	23.75	13%	30.75
8%	24.75	14%	32.25
9%	25.75	15%	33.75
10%	26.75	16%	35.25
11%	27.75	17%	36.75

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$27.75	14%	$33.25
11%	28.75	15%	34.75
12%	30.25	16%	36.25
13%	31.75	17%	37.75

Manganese 1½ to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W, del., carloads .....$1.35 to $1.45
Ferrotungsten, less carloads. 1.45 to 1.55
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered, in carloads ..... 10.00c.
Ferrochromium, 2% carbon .....16.50c. to 17.00c.
Ferrochromium, 1% carbon .....17.50c. to 18.00c.
Ferrochromium, 0.10% carbon .....19.50c. to 20.00c.
Ferrochromium, 0.06% carbon .....20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained V.....$2.70 to $2.90
Ferrocarbontitanium, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace carload and contract per net ton $137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage..... 50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage..... 65.00
Ferromolybdenum, per lb. Mo., del. 95c.
Calcium molybdate, per lb. Mo., del. ..... 80c.
Silico spiegel, per ton, f.o.b. furnace, car lots $38.00
Ton lots or less per ton..... 45.50
Silico-manganese, gross ton, delivered:
2.50% carbon grade 90.00
2% carbon grade 95.00
1% carbon grade 105.00
Spot prices .....$5 a ton higher

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$10.25 to $10.75
No. 2 heavy melting steel	9.50 to 10.00
No. 2 railroad wrought	10.25 to 10.75
Scrap rails	10.25 to 10.75
Rails 3 ft. and under	13.50 to 14.00
Compressed sheet steel	10.25 to 10.75
Hand bundled sheet steel	9.50 to 10.00
Hvy. steel axle turnings	9.00 to 9.50
Machine shop turnings	7.00 to 7.50
Short shov. turnings	7.00 to 7.50
Short mixed borings and turnings	5.25 to 5.75
Cast iron borings	5.25 to 5.75
Cast iron carwheels	11.00 to 11.50
Heavy breakable cast	10.00 to 10.50
No. 1 cast	11.00 to 11.50
Railr. knuckles and couplers	13.50 to 14.00
Rail. coil and leaf springs	13.50 to 14.00
Rolled steel wheels	13.50 to 14.00
Low phos. billet crops	13.00 to 13.50
Low phos. sheet bar crops	13.00 to 13.50
Low phos. plate scrap	12.50 to 13.00
Low phos. punchings	12.50 to 13.00
Steel car axles	13.00 to 13.50

CHICAGO

Delivered Chicago district consumers:

Per Gross Ton

Heavy melting steel	$9.00
Automobile hvy. melt. steel	$8.00 to 8.50
Shoveling steel	8.50 to 9.00
Hydraulic comp. sheets	7.50 to 8.00
Drop forge flashings	6.50 to 7.00
No. 1 busheling	7.00 to 7.50
Rolled carwheels	10.75 to 11.25
Railroad tires	10.75 to 11.25
Railroad leaf springs	10.75 to 11.25
Axle turnings	8.00 to 8.50
Steel couplers and knuckles	10.50 to 11.00
Coil springs	10.50 to 11.00
Axle turnings (elec. fur.)	8.00 to 8.50
Low phos. punchings	10.00 to 10.50
Low phos. plates, 12 in. and under	10.00 to 10.50
Cast iron borings	4.50 to 5.00
Short shoveling turnings	4.50 to 5.00
Machine shop turnings	4.25 to 4.75
Rerolling rails	10.00 to 10.50
Steel rails, less than 3 ft.	10.75 to 11.25
Steel rails, less than 2 ft.	11.50 to 12.00
Angle bars, steel	9.50 to 10.00
Cast iron carwheels	10.00 to 10.50
Railroad malleable	9.00 to 9.50
Agricultural malleable	7.75 to 8.25

Per Net Ton

Iron car axles	$12.00 to $12.50
Steel car axles	10.00 to 10.50
No. 1 railroad wrought	8.00 to 8.50
No. 2 railroad wrought	7.50 to 8.00
No. 2 busheling	3.50 to 4.00
Locomotive tires, smooth	9.00 to 9.50
Pipe and flues	4.50 to 5.00
No. 1 machinery cast	8.00 to 8.50
Clean automobile cast	8.50 to 9.00
No. 1 railroad cast	7.00 to 7.50
No. 1 agricultural cast	7.00 to 7.50
Stove plate	5.25 to 5.75
Grate bars	4.75 to 5.25
Brake shoes	6.00 to 6.50

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$9.25 to $10.00
No. 2 heavy melting steel	8.25 to 8.75
No. 1 railroad wrought	$11.00 to 11.50
Bundled sheets	9.00
Hydraulic compressed, new	9.00 to 9.50
Hydraulic compressed, old	6.50 to 7.00
Machine shop turnings	5.00 to 5.50
Heavy axle turnings	8.50 to 9.00
Cast borings	5.00 to 5.50
Heavy breakable cast	9.50 to 10.00
Stove plate (steel works)	8.00
No. 1 low phos. heavy	13.00 to 14.00
Couplers and knuckles	13.00 to 13.50
Rolled steel wheels	13.00 to 13.50
No. 1 blast furnace	5.00 to 5.50
Spec. iron and steel pipe	8.00
Shafting	15.25 to 16.25
Steel axles	15.50 to 16.00
No. 1 forge fire	9.00
Cast iron car wheels	10.25 to 10.75
No. 1 cast	10.50 to 11.50
Cast borings (chem.)	12.00 to 14.00
Steel rails for rolling	12.00

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$6.75 to $7.25
Scrap rails for melting	8.00 to 8.50
Loose sheet clippings	3.00 to 3.50
Bundled sheets	5.50 to 6.00
Cast iron borings	4.50 to 5.00
Machine shop turnings	4.00 to 4.50
No. 1 busheling	5.50 to 6.00
No. 2 busheling	2.50 to 3.00
Rails for rolling	8.50 to 9.00
No. 1 locomotive tires	8.25 to 8.75
Short rails	11.00 to 11.50
Cast iron carwheels	7.50 to 8.00
No. 1 machinery cast	8.75 to 9.25
No. 1 railroad cast	8.25 to 8.75
Burnt cast	5.75 to 6.25
Stove plate	5.75 to 6.25
Agricultural malleable	7.75 to 8.25
Railroad malleable	7.75 to 8.25

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$8.00 to $8.50
No. 2 heavy melting steel	7.50 to 8.00
Compressed sheet steel	7.25 to 7.75
Light bundled sheet stampings	6.50 to 7.00
Drop forge flashings	7.00 to 7.50
Machine shop turnings	6.00 to 6.50
Short shoveling turnings	6.50 to 7.00
No. 1 busheling	7.00 to 7.50
Steel axle turnings	7.00 to 7.50
Low phos. billet crops	12.50 to 13.00
Cast iron borings	6.25 to 6.75
Mixed borings and short turnings	6.25 to 6.75
No. 2 busheling	6.25 to 6.75
No. 1 cast	10.50 to 11.00
Railroad grate bars	7.00 to 7.50
Stove plate	6.50 to 7.00
Rails under 3 ft.	12.50 to 13.00
Rails for rolling	15.50 to 18.00
Railroad malleable	11.50 to 12.00
Cast iron carwheels	9.75 to 10.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$10.00 to $10.50
No. 2 heavy melting scrap	8.50 to 9.00
Scrap rails	9.50 to 10.00
New hydraul. comp. sheets	8.50 to 9.00
Old hydraul. comp. sheets	7.50 to 8.00
Drop forge flashings	8.50 to 9.00
No. 1 busheling	8.50 to 9.00
Hvy. steel axle turnings	6.50 to 7.00
Machine shop turnings	5.00 to 5.50
Knuckles and couplers	11.00 to 11.50
Coil and leaf springs	11.00 to 11.50
Rolled steel wheels	11.00 to 11.50
Low phos. billet crops	11.50 to 12.00
Short shov. steel turnings	5.50 to 6.00
Short mixed borings and turnings	5.50 to 6.00
Cast iron borings	5.50 to 6.00
No. 2 busheling	5.00 to 5.50
Steel car axles	10.50 to 11.00
Iron axles	10.50 to 11.00
No. 1 machinery cast	10.50 to 11.00
No. 1 cupola cast	9.00 to 9.50
Stove plate	8.50 to 8.75
Steel rails, 3 ft. and under	12.00 to 12.50
Cast iron carwheels	10.00 to 10.50
Industrial malleable	10.50 to 11.00
Railroad malleable	10.50 to 11.00
Chemical borings	7.00 to 7.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$5.50 to $6.00
Scrap T rails	5.50 to 6.00
No. 2 steel	5.00 to 5.25
Breakable cast	6.00 to 6.50
Machine shop turnings	1.25 to 1.50
Bundled skeleton, long	3.75 to 4.00
Forge flashings	4.25 to 4.50
Blast furnace scrap	2.00 to 2.50
Shafting	11.00 to 11.25
Steel car axles	10.50 to 11.00
Cast iron borings, chemical	6.00 to 7.00
Stove plate	.... 6.50

Per gross ton delivered consumers' yards:

Textile cast	$7.50 to $9.00
No. 1 machinery cast	7.50 to 9.00
Railroad malleable	11.00 to 11.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	*$7.00 †$8.00
No. 2 heavy melting steel	*5.50 to †6.50
Heavy breakable cast	6.00 to 6.50
No. 1 machinery cast	7.00 to 7.50
No. 2 cast	6.25 to 6.75
Stove plate	5.50 to 6.00
Steel car axles	11.50 to 12.00
No. 1 railroad wrought	7.50 to 8.00
No. 1 yard wrought, long	6.50 to 7.00
Spec. iron and steel pipe	4.50 to 5.00
Forge fire	5.50 to 6.00
Rails for rerolling	8.00 to 8.75
Short shoveling turnings	2.50 to 3.00
Machine shop turnings	2.50 to 3.00
Cast borings	3.50 to 3.75
No. 1 blast furnace	2.00 to 2.50
Cast borings (chemical)	11.00 to 11.50
Unprepared yard iron and steel	3.50 to 4.00

Per gross ton, delivered local foundries:

No. 1 machinery cast	$10.25
No. 1 hvy. cast (cupola size)	9.00
No. 2 cast	8.00

*For direct car loading only.
†Loading on barge.

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	.... $9.00
Scrap steel rails	.... 10.00
Short shoveling turnings	.... 6.50
Stove plates	.... 6.50
Steel axles	$10.50 to 11.00
Iron axles	10.50 to 11.00
No. 1 railroad wrought	.... 5.50
Rails for rolling	.... 11.00
No. 1 cast	.... 10.50
Tramcar wheels	9.00 to 9.50
Cast iron borings, chem.	.... 8.00

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$8.75 to $9.25
No. 1 heavy melting	7.00 to 7.50
No. 2 heavy melting	6.00 to 6.50
No. 1 locomotive tires	9.50 to 10.00
Misc. stand-sec. rails	8.50 to 9.00
Railroad springs	8.50 to 9.00
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	7.50 to 8.00
No. 1 busheling	5.00 to 5.50
Cast iron borings and shoveling turnings	2.50 to 3.00
Rails for rolling	9.25 to 9.75
Machine shop turnings	2.50 to 3.00
Heavy turnings	5.50 to 6.00
Steel car axles	11.00 to 11.50
Iron car axles	12.50 to 13.00
No. 1 railroad wrought	5.50 to 6.00
Steel rails less than 3 ft.	10.75 to 11.25
Steel angle bars	9.00 to 9.50
Cast iron carwheels	7.00 to 7.50
No. 1 machinery cast	8.50 to 9.00
Railroad malleable	8.50 to 9.00
No. 1 railroad cast	8.50 to 9.00
Stove plate	6.50 to 7.00
Agricult. malleable	8.50 to 9.00

DETROIT

Dealers' buying prices per gross ton:

Heavy melting steel	$7.00 to $7.50
Borings and short turnings	5.00 to 5.50
Long turnings	$3.75 to $4.25
No. 1 machinery cast	9.50 to 10.00
Automotive cast	10.00 to 10.50
Hydraul. comp. sheets	7.00 to 7.50
Stove plate	6.25 to 6.75
New factory busheling	6.00 to 6.50
Old No. 2 busheling	4.00 to 4.50
Sheet clippings	3.50 to 4.00
Flashings	6.00 to 6.50
Low phos. plate scrap	7.50 to 8.00

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$5.50	$5.50
Rails scrap	6.00	4.50
Machine shop turnings	2.50	2.50
Boiler plate	4.50	4.50
Heavy axle turnings	2.50	2.50
Cast borings	3.00	3.00
Steel borings	2.00	2.00
Wrought pipe	2.50	2.50
Steel axles	4.50	6.00
Axles wrought iron	4.50	6.50
No. 1 machinery cast	7.75	9.00
Stove plate	4.50	5.00
Standard carwheels	7.25	7.00
Malleable	6.75	7.00

ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.5% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algeria	9.50c.
Iron, low phos., Swedish, average 68½% iron	9.50c.
Iron, basic or foundry, Swedish, aver. 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Manganese, Caucasian, washed 52%	26c.
Manganese, African, Indian, 44-48%	21c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48½	20c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered*	$17.50 to $18.50
Tungsten, domestic scheelite, delivered†	17.00

Per Gross Ton

Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic Seaboard	$17.00
Chrome, 48%, Cr_2O_3, c.i.f. Atlantic Seaboard	20.00

*Quotations nominal in absence of sales.
†Nominal; no supplies available.

Fluorspar

Per Net Ton

Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines for all-rail shipment	$15.50 to $16.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	17.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	$15.50 to 16.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

COKE, COAL AND FUEL OIL

Coke

Per Net Ton

Furnace, f.o.b. Connellsville Prompt	$3.85
Foundry, f.o.b. Connellsville Prompt	$4.60 to 5.10
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	11.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland, delivered	$9.25
Foundry, Birmingham	6.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	$1.80 to $2.05
Mine run coking coal f.o.b. W. Pa.	2.05 to 2.25
Gas coal, ¾-in. f.o.b. Pa. mines	2.25 to 2.55
Mine run gas coal f.o.b. Pa. mines	2.05 to 2.45
Steam slack, f.o.b. W. Pa. mines	1.55 to 1.65
Gas slack, f.o.b. W. Pa. mines	1.90 to 2.10

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. f.o.b. Baltimore

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. del'd Chicago

No. 3 industrial fuel oil	3.88c.
No. 5 industrial fuel oil	3.35c.

Per Gal. f.o.b. Cleveland

No. 3 distillate	5.50c.
No. 4 industrial	5.25c.
No. 5 industrial	4.25c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$45.00	$40.00
Maryland	45.00	40.00
New Jersey	55.00	45.00
Ohio	45.00	40.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	40.00
Ground fire clay, per ton	7.00	

Chrome Brick

Per Net Ton

Standard size	$45.00

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	$45.00
Chicago	54.00
Birmingham	55.00
Silica clay, per ton	8.00

Magnesite Brick

Per Net Ton

Standard size, burned, f.o.b. Baltimore and Chester, Pa.	$65.00
Unburned, f.o.b. Baltimore	55.00
Imported grain magnesite, f.o.b. Baltimore and Chester, Pa.	65.00
Domestic grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock—	
Rounds and hexagons	*3.45c.
Squares and flats	*3.45c.
Hoops and bands under ¼ in.	3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.69
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count,	65 per cent off list.
Machine bolts, 100 count,	65 per cent off list.
Carriage bolts, 100 counts,	65 per cent off list.
Nuts, all styles, 100 count,	65 per cent off list.
Large rivets, base per 100 lb.	$3.50
Wire, black, soft ann'l'd, base per 100 lb.	*2.70
Wire, galv. soft, base per 100 lb.	*2.925
Common wire nails, per keg	*2.834
Cement coated nails, per keg	*2.834

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.20c.
Soft steel bars	2.95c.
Cold-fin. steel bars:	
Rounds and hexagons	3.50c.
Flats and squares	3.50c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.55c.
Hot-rolled sheets (No. 10)	3.05c.
Spikes (keg lots)	3.50c.
Track bolts (keg lots)	4.65c.
Rivets, structural (keg lots)	3.65c.
Rivets, boiler (keg lots)	3.75c.
	Per Cent Off List
Machine bolts	60 and 5
Carriage bolts	60 and 5
Lag screws	60 and 5
Hot-pressed nuts, sq. tap. or blank	60 and 5
Hot-pressed nuts, hex. tap or blank	60 and 5
Hex. head cap screws	80
Cup point set screws	70 and 10
Flat head bright wood screws	37½ and 10
Spring cotters	50
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.50 off list
No. 8 black ann'l'd wire per 100 lb.	$3.85
Com. wire nails, base per keg	3.05
Cement c't'd nails, base per keg	3.05

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, small shapes	3.22c.
Iron bars	3.22c.
Iron bars, swed. charcoal	6.50c. to 7.25c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.92c.
Flats and squares	4.42c.
Cold-roll. strip, soft and quarter hard	3.32c.
Hoops	3.52c.
Bands	3.52c.
Hot-rolled sheets (No. 10)	3.27c.
Hot-rolled ann'l'd sheets (No. 24*)	3.85c.
Galvanized sheets (No. 24*)	4.50c.
Long terne sheets (No. 24)	5.20c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.25c.
Wire, galv. (No. 10)	3.85c.
Tire steel, 1 x ½ in. and larger	3.65c.
Open hearth spring steel	4.00c. to 10.00c.
Common wire nails, base, per keg	$3.21
	Per Cent Off List
Machine bolts, cut thread: All diameters	70
Carriage bolts, cut thread: All diameters	70
	Per 100 Ft.
Boiler tubes: Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.44c.
Bars, soft steel or iron	3.19c.
Cold-fin. rounds, shafting, screw stock	3.74c.
Hot-rolled annealed sheets (No. 24)	4.09c.
Galv. sheets (No. 24)	4.79c.
Hot-rolled sheets (No. 10)	3.29c.
Black corrug. sheets (No. 24)	4.09c.
*Galv. corrug. sheets	4.79c.
Structural rivets	3.99c.
Boiler rivets	4.09c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fittings up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts:	
1000 lb. or over	70 and 10
200 to 999 lb.	67½ and 10
100 to 199 lb.	65 and 10
Less than 100 lb.	60 and 10

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	2.95c.
*Structural shapes	2.95c.
*Soft steel bars, small shapes, iron bars (except bands)	2.90c.
‡Reinforc. steel bars, sq. twisted and deformed	2.955c.
Cold-finished steel bars	3.73c.
*Steel hoops	3.40c.
*Steel bands, No. 12 and 3/16 in., incl.	3.15c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.55c.
†Galvanized sheets (No. 24)	4.25c.
*Hot-rolled annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, ¼ in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.31c.
Soft steel bars	2.95c.
Reinforc. steel bars	*2.10c.
Cold-finished steel bars	3.40c.
Flat-rolled steel under ¼ in.	3.35c.
Cold-finished strip	†3.00c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 24)	4.61c.
Hot rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
Black ann'l'd wire, per 100 lb.	$2.65
No. 9 galv. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.40

*Plus mill, size and quantity extras.

†Outside delivery 10c, less.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.15c.
New billet reinforc. bars	3.25c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.45c.
Cold-finished bars	3.70c.
Hot-rolled annealed sheets (No. 24)	4.00c.
Galv. sheets (No. 24)	4.70c.
Hot-rolled sheets (No. 10)	3.20c.
Structural rivets	4.35c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.91
Com. wire nails, base per keg (1 to 24 kegs)	3.50
25 to 50 kegs	3.30
Larger quantities	3.10
Cement c't'd nails, base 100-lb. keg	3.50
Chain, 1-in., per 100 lb.	8.35
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$19.03
4-in.	44.96
Lap-welded steel boiler tubes, 2-in.	18.10
4-in.	42.32

BUFFALO

	Base per Lb.
Plates	3.37c.
Struc. shapes	3.25c.
Soft steel bars	3.00c.
Reinforcing bars	3.60c.
Cold-fin. flats and sq.	3.55c.
Round and hex.	3.55c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Heavy hot-rolled sheets, 3/16 in., 24 to 48 in. wide	3.62c.
Galv. sheets (No. 24)	4.70c.
Bands	3.42c.
Hoops	3.42c.
Hot-rolled unannealed sheets	3.17c.
Com. wire nails, base per keg	$3.25
Black wire, base per 100 lb.	3.55c.

BOSTON

	Per Lb.
Beams, channels, angles, tees, zees	3.52c.
H beams and shapes	3.52c.*
Plates—sheared, tank and univ. mill, ¼ in. thick and heavier	3.52c.*
Floor plates, diamond pattern	5.33c.
Bar and bar shapes (mild steel)	3.30c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.60c. to 4.60c.
Half rounds, half ovals, ovals and bevels	4.55c.
Tire steel	4.55c.
Cold-finished rounds and hexagons	5.25c.*
Cold-rolled strip steel	3.245c.
Cold-finished squares and flats	5.75c.
Blue annealed sheets, No. 10 gal.	3.60c.
One pass cold-rolled sheets No. 24 ga.	4.15c.
Galvanized steel sheets, No. 24 ga.	4.85c.
Lead coated sheets, No. 24 ga.	5.80c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials. *Base.

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.55c.	3.70c.	3.55c.
Shapes, standard	3.55c.	3.70c.	3.55c.
Soft steel bars	3.60c.	3.70c.	3.60c.
Reinforcing bars	3.50c.	3.50c.	3.50c.
Hot-rolled annealed sheets (No. 24)	4.40c.	4.45c.	4.40c.
Hot-rolled sheets (No. 10)	3.75c.	3.80c.	3.75c.
Galv. sheets (No. 24)	5.00c.	5.05c.	5.00c.
Cold finished steel: Rounds	5.95c.	5.95c.	4.75c.
Squares and hexagons	7.20c.	7.20c.	6.00c.
Flats	7.70c.	7.70c.	7.00c.
Common wire nails —base per keg less carload	$3.40	$3.25	$3.30

All items subject to differentials for quantity.

Pipe Lines

Tulare County Board of Supervisors, Visalia, Cal., is receiving petitions for formation of Central Counties Municipal Utility District for construction of welded steel pipe line for natural gas service to Visalia, Lindsay, Porterville, Hanford, Tulare, Exeter and Lemoore. Main line will run from gas fields in Kettleman Hills district to different municipality limits, about 90 miles; steel pipe line distribution systems will be installed in cities and towns noted. Cost about $900,000. Mayor Charles Burr, Lindsay, is active in project.

Linton, Ind., plans about seven miles of steel pipe for gas distribution. Fund of $83,000 is being arranged through Federal aid.

United States Engineer Office, Postal Telegraph Building, Kansas City, Mo., asks bids until Nov. 12 for spillway at Fort Peck, Mont., dam project, including 23,000 lb. steel vent pipe.

Upland, Cal., has rejected bids for steel pipe, and will make purchase in open market, including 7920 ft. 14-in., and alternates for same quantity 8, 10 and 12-in. steel pipe, all 3/16-in. metal. R. G. Manley is city service manager.

Ridgeland, Miss., closed bids Nov. 6 for 5060 ft. of 1 and 2-in. galvanized pipe for waterworks system. H. R. Covington, Canton, Miss, is consulting engineer.

Standard Oil of California has placed contract for construction of a 38,000-ft. pipe line of 20-in. welded steel and 5/16 in. gage, at its refinery, Richmond, Cal. National Tube Co. is reported to have booked 1250 tons for line. This will replace plans for a 500,000 bbl. increase in tankage. Entire expansion program, calling for an expenditure of nearly $2,000,000, will also include modernization of refinery plants. Structural steel required for these units is under contract.

Casting Production Off; Barrel Shipments Rise

WASHINGTON, Nov. 7.—September production of commercial steel castings, as reported to the Bureau of the Census by 164 makers, amounted to 31,816 net tons, compared with 43,748 tons in August and with 28,087 tons in September, 1933. New orders booked during September totaled 20,030 tons, as against 25,538 tons in the preceding month and 25,220 tons in September of last year.

Malleable casting output, as reported to the bureau by 112 makers, declined to 21,541 net tons in September from 23,910 tons in August and 27,078 tons in the corresponding 1933 month. Shipments were 20,360 tons, 25,784 tons and 22,744 tons in September, August and September, 1933, respectively, while orders booked were 19,511 tons in September, 21,306 tons in August and 22,744 tons in September, 1933.

September production of steel barrels amounted to 412,592 units, according to reports by 31 manufacturers, as against 361,852 units in August and 580,471 units in September, 1933. September shipments rose to 417,114 barrels from 364,081 in August, but compared with 585,842 units in September of last year. Unfilled orders at the end of the month were 641,283 units, as against 644,814 one month before and 567,663 at the end of last September.

New orders for steel boilers, received during September by 68 identical manufacturers, totaled 626, or 539,242 sq. ft. In August the corresponding figures were 597 and 565,843 sq. ft., while in September, 1933, 447 units were ordered, calling for 428,182 sq. ft.

Lead and Spelter Prices Reduced—Tin Market Still Quiet—Antimony Rises

Copper Sales Maintained at Recent Levels with Foreign Price Advance Halted—Zinc Off Ten Points and Lead Five

NEW YORK, Nov. 7.—Demand for copper is well sustained at recent levels, but daily sales average only 500 to 800 tons. Consumption is believed to be no lower and heavier buying cannot be long delayed. The copper code authority has announced that primary producers have agreed to continue the suspension of sales allocations to them through the month of November. During this time all current sales are to be allocated to secondary, custom and by-product copper and only when these quotas have been filled will sales be allocated to primary producers. Under the plan, primary producers waive their rights to give notice under the sales plan of the copper code as to suspended allocations. The price rise in the European market was halted last week after quotations had reached 7.15c. a lb., c.i.f. usual Continental base ports, and the market on Monday was quoted at 6.75c. a lb. This morning's prices are higher, ranging from 6.85c. to 6.90c. and the heavy buying reported abroad may lead to higher quotations this week.

Tin

The market continues very dull with price fluctuations confined largely to the movement of Sterling. Straits metal at New York was quoted today at 51.25c. a lb., or 10 points over the quotations of Monday, which had been unchanged for several days. In the London market spot standard was quoted on first call this morning at £228 7s. 6d., and futures at £228 10s., while the Singapore market was quotable at £229 10s. According to the statistical office of the International Tin Research and Development Council, world consumption of tin in the year ended Aug. 31 amounted to 121,400 tons, compared with 117,000 tons in the preceding year. After allowing for depletion of consumers' stocks, actual consumption for the same comparable periods was estimated at 136,900 tons and 121,800 tons respectively, an increase of 12.4 per cent.

Lead

Sales are fairly well maintained from day to day, with paint manufacturers active takers. However, no semblance of a buying movement is perceptible and sales seem to be running somewhat behind consumption. A further reduction in stocks during October is expected to be announced later in the month. November metal is thought to be about 75 per cent sold and a little December demand is reported. Late last week the seller which has been asking a five-point premium over the regular market reduced its quotations to the common level and on Monday the leading interest posted a five-point decline. This has been met by all producers and the market is now quotable at 3.50c. a lb., St. Louis, and 3.65c., New York. Ore prices in the Joplin market are unchanged.

Zinc

Keen competition for business finally weakened prices last week and a five-point reduction was announced on Friday. Although little additional demand was attracted, a similar decline was posted on Monday and the market is now quoted at 3.75c. a lb., East St. Louis, and 4.10c., New York, the lowest levels of the year. Last week's sales amounted to only about 2000 tons, a sharp drop from the 6200 tons which changed hands in the previous comparable period. This week's price reduction is partly attributable to a lower ore market, as quotations at Joplin eased off $1 a ton in the late trading Saturday to $24 and $25 a ton respectively for the flotation and mill grades. Ore production last week amounted to 7300 tons, compared with shipments of 6400 tons, but curtailment is expected to become effective late this week.

Antimony

Prices have advanced sharply with the spot market now quotable at 10.50c. a lb., f.o.b. New York.

The Week's Prices. Cents Per Pound for Early Delivery

	Oct. 31	Nov. 1	Nov. 2	Nov. 3	Nov. 5	Nov. 7
Electrolytic copper, N. Y.*	8.75	8.75	8.75	8.75	8.75	8.75
Lake copper, N. Y.	9.12½	9.12½	9.12½	9.12½	9.12½	9.12½
Straits tin, Spot, New York	51.15	51.15	51.15	....	51.15	51.25
Zinc, East St. Louis	3.85	3.85	3.80	3.80	3.75	3.75
Zinc, New York	4.20	4.20	4.15	4.15	4.10	4.10
Lead, St. Louis	3.55	3.55	3.55	3.55	3.50	3.50
Lead, New York	3.70	3.70	3.70	3.70	3.65	3.65

*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, virgin 99 per cent plus, 19c. to 22c. a lb., delivered.
Aluminum, remelt No. 12 (alloy), carload lots delivered, 14c. a lb., average for week.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 10.50c. a lb., New York.
Brass ingots, 85-5-5-5, 8.25c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	52.50c. to 53.50c.
Tin, bar	54.50c. to 55.50c.
Copper, Lake	10.25c. to 11.00c.
Copper, electrolytic	10.00c. to 10.50c.
Copper, castings	9.75c. to 10.75c.
*Copper sheets, hot-rolled	16.00c.
*High brass sheets	14.50c.
*Seamless brass tubes	16.00c.
6Seamless copper tubes	16.25c.
*Brass rods	13.00c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	4.50c. to 5.50c.
Lead, bar	5.50c. to 6.50c.
Lead, sheets	7.50c.
Antimony, Asiatic	11.75c.
Alum., virgin, 99 per cent. plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent.	18.00c. to 19.00c.
Solder, ½ and ½	32.00c. to 33.00c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	55.50c.
Tin, bar	57.50c.
Copper, Lake	10.00c.
Copper, electrolytic	10.00c.
Copper, castings	9.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	4.75c. to 5.00c.
Lead, bar	7.75c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	59.50c.
Solder, ½ and ½	33.25c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	5.50c.	6.25c.
Copper, hvy. and wire	5.37½c.	5.87½c.
Copper, light and bottoms	4.37½c.	4.87½c.
Brass, heavy	2.87½c.	3.50c.
Brass, light	2.12½c.	2.87½c.
Hvy. machine composition	4.12½c.	4.75c.
No. 1 yel. brass turnings	4.12½c.	4.75c.
No. 1 red brass or compos. turnings	3.87½c.	4.37½c.
Lead, heavy	2.75c.	3.12½c.
Zinc	2.00c.	2.37½c.
Cast aluminum	9.62½c.	10.75c.
Sheet aluminum	11.00c.	12.50c.

Non-Ferrous Averages

THE average prices of the major non-ferrous metals for October based on daily quotations in the THE IRON AGE, are as follows:

	Average
Electrolytic copper, N. Y.*‡	8.75c. a lb.
Lake copper, Eastern delivery*	9.12½c. a lb.
Straits tin, Spot, N. Y.	51.01c. a lb.
Zinc, East St. Louis	3.84c. a lb.
Zinc, New York	4.19c. a lb.
Lead, St. Louis	3.50c. a lb.
Lead, New York	3.65c. a lb.

*Blue Eagle copper. ‡Price ¼c. higher in Connecticut Valley.

Reinforcing Steel

Awards 1155 Tons—New Projects 6550 Tons

Beverly-Salem, Mass., 165 tons, water project, to Northern Steel Co.

New York, 659 tons, Harts Island piers of Tri-Borough Bridge; 250 tons to Igoe Brothers and 400 tons to Capital Steel Co.

St. Lawrence County, N. Y., 200 tons, mesh for highway, to Truscon Steel Co.

Tempeauleau, Wis., 325 tons, dam across Mississippi River, to Paper Calmansen Co., St. Paul, Minn.; previously reported to an unnamed bidder.

State of California, 130 tons, highway work in five counties, to unnamed bidders.

NEW REINFORCING BAR PROJECTS

Weymouth, Mass., 165 tons, filtration plant.

Hartford, Conn., 130 tons, filtration plant.

Cleveland, 230 tons, nine-mile creek culvert.

Cleveland, 140 tons, Westerly sewage treatment plant.

Sioux Falls, S. D., 100 tons, city hall.

Milwaukee, 4000 tons, filter plant; bids close Nov. 14.

Canton, Mo., 1200 tons, dam across Mississippi River; bids Nov. 27.

Winona, Minn., 300 tons, dam No. 5A across Mississippi River; bids Dec. 12.

State of Nebraska, 175 tons, bridges.

Fort Peck, Mont., 18,000 tons, spillway dam; new bids Nov. 12.

Los Angeles, 100 tons, school alterations; bids under advisement.

Ontario, Ore., 4000 tons, Malheur River and Dead Ox siphons, under precast reinforced concrete pipe alternate; bids Nov. 26.

Cast Iron Pipe

Salem-Beverly, Mass., has awarded 400 tons to United States Pipe & Foundry Co., previously reported as 150 tons.

Somerville, Mass., has awarded 280 tons of 10 and 12-in. to Warren Foundry & Pipe Corpn.

Cleveland will take bids soon for two miles or about 500 tons of 5-in. steel or cast iron pipe.

Hagerman, N. M., plans water pipe lines. Fund of $49,000 has been secured through Federal aid for this and other waterworks construction, including elevated steel tank and tower, pumping machinery, etc. O. R. Tanner is city clerk.

Gulf Water Co., St. Petersburg, Fla., plans pipe line to Pass-a-Grille and Indian Rocks, Fla., for main water trunk line.

Poplar Heights, Ky., plans water pipe lines. Fund of $31,000 is being arranged for this and other waterworks construction. H. B. Cassin, Citizens Building, Louisville, is consulting engineer.

Stamford, Tex., closes bids Nov. 12 for 12 and 16-in. for water supply; also for two elevated steel storage tanks, 500,000 and 1,000,000-gal., respectively, pumping machinery and other waterworks equipment. Fund of $155,000 has been arranged through Federal aid. W. J. Powell, Republic Bank Building, Dallas, Tex., is consulting engineer.

Shawnee Township Board, care of L. C. Maddox, 2216 South Twenty-sixth Street, Kansas City, Mo., closed bids Nov. 9 for 62,300 ft. of 6-in. for water system in Shawnee Township, near Argentine, Kan. Fund of $215,000 has been arranged. Charles A. Haskins & Co., Finance Building, Kansas City, Mo., are consulting engineers.

Fairhope, Ala., asks bids until Nov. 16 for 6 and 8-in. for water system; also for 75,000-gal. elevated steel tank and tower, pumping machinery and other waterworks equipment. J. B. Converse & Co., Inc., State Office Building, Mobile, Ala., is consulting engineer.

Fond du Lac, Wis., asks bids until Nov. 13 for cast iron pipe for water supply.

Pensacola, Fla., closes bids Nov. 20 for about 12 miles for water supply; also for 500,000-gal. elevated steel tank and tower and other waterworks equipment. George Roark is city manager.

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Santa Cruz, Cal., will soon take bids for about 2200 ft. of 12-in. and quantity of smaller size for pipe line in Ocean Street, replacing present water mains.

Fort Smith, Tex., will ask bids in about 60 days for 23 miles of 27-in. for water trunk line and smaller sizes; also for 6,000,000-gal. filtration plant. W. R. Holway, 302 East Eighteenth Street, Tulsa, Okla., is consulting engineer.

United States Engineers Office, Kansas City, Kan., asks bids until Nov. 12 for 130,500 ft. of 6, 10, 12 and 18-in. for drains at Fort Peck, Mont.

Moab, Utah, has purchased 200 tons from Provo Foundry Co.

Modesto, Cal., will take bids Nov. 14 on 119 tons of 4 to 12-in.

San Francisco has awarded 7460 tons to United States Pipe & Foundry Co. for high pressure line.

Railroad Equipment

Minnesota Mining & Mfg. Co. contemplates buying 25 to 100 hopper cars.

Illinois Central has ordered a five-car Diesel electric streamlined passenger train from Pullman Car & Mfg. Corpn.

Illinois Central has ordered eight Diesel-electric locomotives from the American Locomotive Co., one from the Busch-Sulzer Diesel Electric Engine Co., one from the Winton Engine Co., General Motors subsidiary, and one from the Ingersoll-Rand Co.

Lehigh Valley is taking bids Nov. 9 for 250 50-ft. gondola cars.

RAILS

Metropolitan Water District, Los Angeles, will take bids Nov. 13 for 690 tons of 40-lb. T-rails, 3945 pairs angle splice bars, 55 kegs track bolts and 280 kegs track spikes.

Extension of Automobile Code Hailed as Defeat for Labor

WASHINGTON, Nov. 7.—Extension without change until Feb. 1, by Presidential order, of the automobile code was looked upon as a clear defeat of organized labor. It had "insisted" upon a public hearing, the 30-hr. week and elimination of the merit clause. Its "demand" for a public hearing was supported by the Labor Advisory Board of the NRA.

Apparently as a means of placating labor, however, the President, in identical letters to President Alvan Macauley of the Automobile Manufacturers' Association and President William Green of the American Federation of Labor informed them that he had ordered an investigation which would enable him to determine whether or not a public hearing will be necessary when the code again comes up for renewal. The investigation, probably to be made under the direction of the National Industrial Recovery Board, will study the matter of stabilization in the industry, wages and hours. Organized labor has also "insisted" that the peaks and dips in employment be wiped out. The industry obviously has also been studying the same question almost since its inception. The study, therefore, on this point, probably will develop little, if anything, new.

Presidential intervention over extension of the code was represented as having been necessary to settle the sharp row between the industry and labor. However, there is a rather well settled conviction that the row was not as sharp as it was pictured. While labor officials exhibited their usual militant attitude it is not believed they had the slighest expectation of the industry yielding to their demands. Particularly is it doubted that they thought they could get the industry to reduce its average work week from 35 hours to 30 hours. The existing work week of 35 hours, inadvertently stated as 40 hours in THE IRON AGE of Nov. 1, is the shortest work week in any of the major industries, except bituminous coal which also has a 35-hour work week.

The principal importance attached to the Presidential "intervention" is that it emphasizes the increased personal direction he has taken with regard to the newly reorganized NRA. It was the first time in the Blue Eagle era that the President has personally announced renewal of a code.

The settlement of the automobile code controversy also is held to be significant of the anxiety now being shown by Washington in keeping industrial peace. There is much more apprehension over the continued lag in recovery than is manifest on the surface and industry is evidently being given encouragement that previously was not existent.

Steel Labor Hearings Postponed By Board

WASHINGTON, Nov. 7.—The National Steel Labor Relations Board has been compelled to re-arrange its heavy and growing schedule of hearings on complaints and petitions of lodges of the Amalgamated Association of Iron, Steel and Tin Workers, concerning collective bargaining.

Because counsel for the company and employees are engaged in the Weirton Steel Co. case at Wilmington, Del., hearing in the Jones & Laughlin Steel Corpn. case in Pittsburgh has been postponed from Nov. 8 to Nov. 16, and the date of hearings in the cases of the Pittsburgh Steel Co. and Allegheny Steel Co., also to be heard in Pittsburgh, have been advanced one day to Nov. 15. Hearings in Chicago in the cases of the Acme Steel Co. and the Illinois Steel Co., to be held in Chicago, have been set for Nov. 13 and 14, respectively.

On Nov. 8 the board will sit at Boston at a hearing on a complaint against the Northern Steel Co., Somerville, Mass.

Fireproof Ships Urged By Commerce Official

WASHINGTON, Nov. 7.—That legislation will be asked at the next session of Congress for the extensive use of fire-resisting material in ship construction was made evident by the report submitted today on the Morro Castle disaster. Presented to Secretary of Commerce Roper by Dickerson N. Hoover, assistant director, Bureau of Navigation and Steamboat Inspection, the report again recommended fireproof construction of ships. Mr. Hoover has urged such construction as far back as 1914, but the proportions of the Morro Castle disaster, the cause of which was declared to remain a mystery, intensified efforts for such legislation. The President recently indicated that he was strongly in favor of steel construction for the interior as well as exterior of ships. "Attention should be immediately given to fireproof construction of passenger ships," Mr. Hoover reported, in pointing out that the disaster happened to an ocean steamer.

"Fireproof construction should certainly be studied with reference to this class of steamer, and in doing so attention should be given not alone to the use of non-combustible materials for construction, but also to the manner in which this material is put together."

Ship design was pointed to as an important factor in the ability to fight fire and should cover not only zoning of the vessel by subdivision bulkheads and firescreen bulkheads of the superstructures, but also the control of drafts, ventilating systems, etc.

It was also recommended that furniture should be fire resisting as well as drapes. His proposed method of approaching the matter is organization of a technical staff in Washington which would pass, first, upon construction of hulls and also, of course, it was stated, upon superstructure. The recommendation indicates that if the law were so changed as to require that those features shall meet the approval of the director of the bureau, the Department of Commerce would be able to set a high standard not only with the reference to inspection of hulls but also inspection of boilers and the improvement of ships' personnel.

Fabricated Structural Bookings Decline

BOOKINGS of fabricated structural steel during September registered a low for the recovery period, according to figures compiled by the American Institute of Steel Construction. The records materially lowered the average for the third quarter. This was 17 per cent less than the average bookings of the first quarter of 1934 and approximately 30 per cent less than the average bookings of the second quarter of this year. The shipments of September fell below the shipments of the month previous, August, but were approximately 29 per cent larger than in the same month last year.

These figures are based upon reports received from shops representing 82 per cent of the entire industry. The backlog of the industry is consequently at least 17 per cent less than it was at the beginning of the third quarter, and only 4 per cent larger than it was this month last year.

Ore Producers Win Tax Reduction

PRODUCERS of Lake Superior ore won a 17 per cent tax reduction on iron ore in a decision rendered by five district judges in Duluth, Minn., Nov. 2. The State of Minnesota sued the Oliver Iron Mining Co. and several other producers for the collection of delinquent taxes for 1932, which these companies had refused to pay. The amount involved for that year and 1933, which the decision also covers, is approximately $4,000,000.

Navy Department to Open Bids on Steel

WASHINGTON, Nov. 7.—The Bureau of Supplies and Accounts, navy department, will open bids Nov. 20 on 353 tons of steel bars and 264 tons of strip steel for the heavy cruiser *Wichita* and the light cruisers *Brooklyn* and *Honolulu*. The cruisers *Wichita* and *Honolulu* are part of the new navy building program, the former to be built at the Philadelphia and the latter at the Brooklyn navy yard. The *Brooklyn* is a new cruiser to be built at the Brooklyn yard.

The Department of Agriculture opened bids today for 69 lookout towers, involving 520 tons of shapes, bar size angles, etc., for the forest service.

Union Lodges File More Steel Complaints

WASHINGTON, Nov. 7. — The Amalgamated Association of Iron, Steel and Tin Workers continues to work beyond union hours with its complaints against the steel industry. Last Thursday, lodges of the association filed complaints and petitions with the National Steel Labor Relations Board against the Illinois Steel Co., Gary, Ind.; the Pittsburgh Steel Co., Monessen and Allenport, Pa., and the Allegheny Steel Co., Brackenridge, Pa.

A petition for an election by employees of the Illinois Steel Co., members of Gary Lodge No. 44, Steel City Lodge No. 48 and United Lodge No. 52, will be held Nov. 15 in Chicago.

Employees of the Pittsburgh Steel Co., at its Monessen and Allenport plants, filed a complaint alleging denial of bargaining rights and a petition requesting an election by employees at the Monessen plant. The hearing on this complaint and petition is scheduled to be held in Pittsburgh, Nov. 16.

The Allegheny Steel Co. case is a complaint by members of Straight Forward Lodge No. 180 alleging discrimination for union activity in the discharge or layoff of four employees. It will be heard in Pittsburgh Nov. 16.

Hearings in the cases of the Youngstown Sheet & Tube Co. and the Acme Steel Co. will be resumed in Chicago Nov. 12, 13 and 14. The complainants in these cases were heard by the board in Chicago in October. The Youngstown Sheet & Tube Co. case involves a petition for an election at its Indiana Harbor and East Chicago plants. The employees of the Acme Steel Co. have filed a similar petition.

As previously announced, a hearing on a complaint of the employees of the Jones & Laughlin Steel Corpn., at Aliquippa, Pa., will be held by the board in Pittsburgh beginning Nov. 8. This complaint alleges that, through intimidation, interference and coercion, the company has attempted to break up the formation of an Amalgamated lodge by its employees.

Collings Resigns Steel Institute Secretaryship

L. V. COLLINGS has resigned as secretary of the American Iron and Steel Institute to enter the legal department of Standard-Vacuum Oil Co., 26 Broadway, New York. Mr. Collings has been associated with the steel institute since January of this year. He formerly practiced corporation law in New York and for a period of years previously was connected with the Standard Oil Co., of New York and stationed in China.

Republic's Loss Rises Sharply

REPUBLIC STEEL CORPN. and subsidiary companies had a net loss of $2,998,600 for the third quarter as compared with a net profit of $864,124 for the second quarter and with a net profit of $148,239 for the third quarter last year.

The Interlake Iron Corpn., Chicago, had a consolidated net loss of $344,720 in the quarter ended Sept. 30, compared with a $221,585 loss in the preceding period and with a loss in the third quarter of 1933 of $215,228. For the nine months ended Sept. 30, the company's consolidated net loss was $635,261.

Cleveland Labor Disorder May Stop Coercion

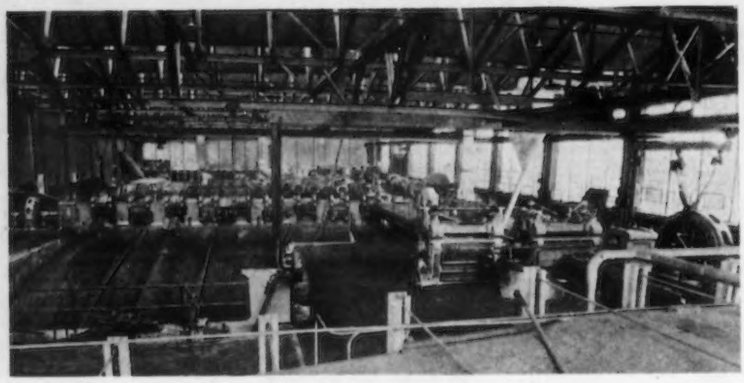
THE basis of settlement by the National Labor Relations Board which prohibits coercion in the Cleveland A. & P. controversy is described by the National Association of Manufacturers as opening the way for curtailing the disastrous series of strikes by giving Federal recognition to terrorism by union members against other employees who desire to work.

The association declared "the national Administration, by specifically preventing coercion on the part of unions, officially affirms President Roosevelt's declaration in settling the automobile strike against 'coercion from any source.'"

The statement of the association was based upon a report made at a meeting of the employment relations committee under the chairmanship of W. R. Webster, chairman of the Bridgeport Brass Co., Bridgeport, Conn.

The association emphasized that the type of union coercion mentioned by the Government obviously referred to the bullying tactics of unions through which flying squadrons force thousands out of work while industry seeks to stop the unemployment which blocks recovery.

To meet this situation the association announced formally that it would urge upon all state legislatures, as they convene, the necessity of enacting six specific provisions into law for the purpose of fixing the legal responsibility of labor organizations for their acts.



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September Coke Production Lower

A FURTHER decline marked the production of coke in September. The output of both beehive and by-product coke amounted to 2,229,571 tons, or 74,644 tons per working day. This represents a decrease of 0.7 per cent in comparison with the daily rate of 75,157 tons prevailing in August. Despite a three-month recession, however, accumulated coke tonnage for the first nine months of 1934 shows an increase of 23.2 per cent over the corresponding period of 1933.

Production of by-products coke for the 30 days of September totaled 2,174,771 tons, a daily average of 72,492 tons. Compared with August, the September rate declined 1.4 per cent. The daily average of pig iron production decreased 12.0 per cent; following this trend, though to a lesser degree, coke production at furnace plants decreased 4.4 per cent, while that at merchant plants increased 2.9 per cent.

Beehive coke production increased substantially during the month, the daily average of 2,192 tons being 35.4 per cent higher than that of August.

Stocks at by-product plants rose from 2,648,085 tons to 2,845,917 tons, or 7.5 per cent, the increase being shared almost equally by furnace and merchant plants. Although stocks have risen steadily for four months, the average to date is 7.6 per cent below the same period of 1933.

Courses on Metallurgy Offered by A.S.M.

THE Pittsburgh chapter of the American Society for Metals will offer three courses in metallurgy during the winter months in order to increase membership in the organization. The fee for the course is $10, which will include membership in the society for one year.

Howard Scott, Westinghouse Electric & Mfg. Co., East Pittsburgh, will offer the first course on the structure of metals and alloys, beginning Nov. 13, and continue weekly until Dec. 11. The heat treatment of steel will be covered by Dr. F. H. Allison, Crucible Steel Co. of America, at weekly intervals from Jan. 15 to Feb. 12. Max Leightner, Carnegie Steel Co., will offer a course in the manufacture of steel in the open-hearth, beginning Feb. 26.

Twelve Companies Bid On Steel for the Navy

WASHINGTON, Nov. 7.—Filed prices apparently were uniformly followed in connection with bids opened last Friday by the Bureau of Supplies and Accounts, Navy Department, for 4432 tons of plates and 348 tons of steel bars and strip for eight destroyers to be built in navy yards. Bids were submitted by 12 steel companies, five galvanizing companies and two jobbers. The tenders are complicated by reason of numerous riders relating to extra, shipping weights, etc., that it is probable it will be some time before study of them is completed and awards made.

Detroit Metals Group Anniversary Meeting

THE twentieth anniversary meeting of the Detroit chapter of the American Society for Metals will be held on Nov. 12. Dr. Zay Jeffries, consulting metallurgist, Aluminum Co. of America, will speak on "Non-Ferrous Metals—Today and Tomorrow." Professor Clair Upthegrove of the University of Michigan will be chairman of the technical session. Preceding this session will be an "old timers meeting." C. N. Dawe, Vanadium Corpn. of America, will read the paper which he gave at the first meeting of the Steel Treaters Research Society in Detroit in 1914. This society was merged with the American Steel Treaters Society of Chicago in 1920 to form the American Society for Steel Treating.

Many charter members of both old societies are expected to be present at this meeting, which will be in charge of W. P. Woodside, vice-president Climax Molybdenum Co. B. F. Sheppard and W. H. Eisenman, president and secretary, respectively, of the American Society for Metals, will be guests of the Detroit chapter at this session.

MAPI To Meet At Cincinnati Nov. 20

THE Machinery and Allied Products Institute will conduct a three-day conference in Cincinnati, beginning Nov. 20. The meeting has as its purpose the stimulation of capital goods industries.

Arrangements for the meetings have been completed by William J. Kelly, Chicago, president of the Machinery and Parts Association. John W. O'Leary, former president of the National Metal Trades Association, is president of the institute.

Non-Ferrous Metals—Past and Future

(Concluded from Page 23)

becomes substantial, however, it should bring with it a great change in the non-ferrous industry. The scarcer important metals such as copper, lead, zinc, tin and nickel should enter a veritable boom period. High prices should accompany large volume. At the same time the need of making the more plentiful metals such as iron, aluminum and magnesium even more adaptable to man's use would offer a challenge to the ingenuity of research workers.

It also could be assumed that western Europe and North America have not reached a peak either in metal consumption per capita or in population. The urge for a higher standard of living should be strong enough to insure an upward trend. The following, therefore, may be listed as favorable factors in the non-ferrous metal industry of the future.

(A) Because business is at a low ebb it should increase and carry with it an increased consumption of non-ferrous metal.

(B) Elapsed time is in favor of non-ferrous metals receiving more than their former share of metal consumption.

(C) The western world would not have reached its peak either in metal consumption per capita or in population.

(D) Any increase in metal consumption per capita in the backward countries will be exceptionally favorable to the non-ferrous metal industry.

It must be admitted that the world non-ferrous metal industry, with the exception of gold, is at present in an unsatisfactory state. But in trying to look a few years, rather than a few months, hence, the industry should receive much comfort in the trends indicated above.

Results Are What Count

If you want real economy—look to results rather than to first cost. It is on this basis that "HERCULES" (Red-Strand) Wire Rope continues to make and hold friends. There are reasons, of course, why this wire rope is so dependable and long lasting, and we are always glad to give full details to everyone interested in saving money. Made in a wide range of constructions including Round Strand, Flattened Strand, Preformed, Non-Rotating and Steel Clad types.

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NEW YORK—CHICAGO—DENVER—SAN FRANCISCO

price of high-carbon spring wire will have the effect of halting these plans.

Chrysler Corpn. has no intention of constructing an assembly plant at Baltimore, as reported elsewhere. It will continue to manufacture all of its cars in its Detroit factories, supplemented by the output of its Pacific Coast factory.

Slow Progress on New Models

Plymouth is reported to have scrapped completely late last week plans for its 1935 cars and to have started over again on Monday. This doesn't necessarily mean, however, that several million dollars worth of dies will be discarded. This disruption of Plymouth's original program will result in considerable delay in getting started on volume production. It now seems only a remote possibility that Plymouth will make any new cars this month.

Chevrolet is moving ahead slowly and won't be turning out 1935 Master passenger cars until about Jan. 1. Orders for steel have been held up because new sizes in many instances have not yet been approved. Nevertheless, releases from Chevrolet as well as from other General Motors divisions should increase considerably this month. Steel bookings from Ford, General Motors and Chrysler are more generous in volume, but still are far from satisfactory. An improvement in the business from these sources is expected later this month, with most of the tonnage specified for December delivery. Plymouth, it will be recalled, bought a substantial portion of is steel requirements for the initial run on its 1935 models last June, before prices advanced. Fisher Body has given some steel releases for its Cleveland plant.

Final check-up of October figures puts production then at 120,000 units. November will be doing well if it shows an output of 70,000 units. While December will bring an upswing in operations, it is yet too early to determine what total assemblies are likely to be. Various parts makers are getting into production as releases come through, principally from Ford.

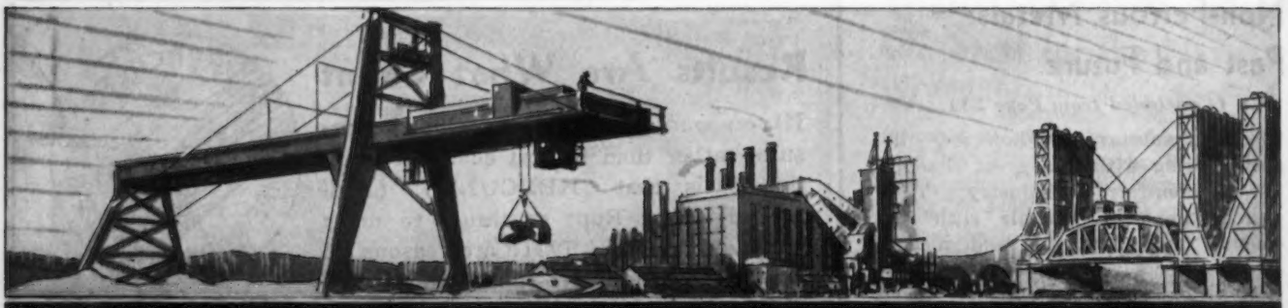
Detroit Notes

Electric Auto-Lite Co. has established a hub cap division to handle a large contract from Chrysler Corpn. for 2,000,000 hub caps for Plymouth and Dodge passenger cars and Dodge trucks. It will be housed in the Hamilton Street plant of Moto-Meter Gauge & Equipment Corpn. in Toledo. . . . Nash Motors Co. is moving equipment from its Racine, Wis., plant to Kenosha where motors for the Nash six will be made hereafter. Motors have been manufactured heretofore at Racine and shipped by truck to Kenosha. Production on the Lafayette car will be continued at Racine. . . . Yates-American Machine Co., Beloit, Wis., has begun the manufacture of automobile radiators. . . . Willys-Overland will start production of 15,000 units about Nov. 20, with 2500 men on its payroll. The first 5000 cars will be completed by the end of February and the remainder by next June 30. . . . The strike of drivers of 25 haulaway companies engaged in transportation of new cars from factories to dealers has been settled. . . . Federal-Mogul Corpn., Detroit, is to produce cylinder heads made of copper and copper alloys. It is claimed that higher compression ratios are practical with copper heads than with other standard materials.

This Week on the Assembly Line

(Concluded from Page 55)

mill will be erected to supply material to the L. A. Young Spring & Wire Corpn. is reported still under consideration. This company has long been of the opinion that steel wire prices were too high and recently a new company was incorporated by interests identified with L. A. Young for the avowed purpose of building a wire mill. It is hoped in the steel trade that the reduction of $6 a ton in the



PLANT EXPANSION AND EQUIPMENT BUYING

Ford Buying Dominates Machine Tool Market—Export Orders in Prospect

HAVING placed orders for grinding machines amounting to $150,000 and additional large rebuilding jobs, the Ford Motor Co. is the center of interest in the machine tool market this week. The company's retooling operations for its 1935 models are expected to cost as much as $2,500,000. Additional inquiry is coming from the automotive industry and prospective buyers are demanding urgent delivery. One company wishes to buy six tools and has specified delivery in three weeks which is almost impossible.

Export inquiry is also more active and Citroen, French automobile maker, is again in the market for American tools. The company may buy equipment in the United States costing up to $100,000.

The machine tool market is otherwise rather quiet, although sentiment is greatly improved.

NORTH ATLANTIC

Superintendent of Lighthouses, St. George, Staten Island, N. Y., asks bids until Nov. 12 for 363 special class steel plate buoys, welded construction, each with steel bottom casting (Proposal 47366), eight signal controllers, table mounting type, complete (Proposal 47380); until Nov. 14, five gas buoys (Proposal 47337); until Nov. 15, 120 wrought iron buoy swivels, 1100 wrought steel buoy shackles with riveted pins, and 7000 steel buoy shackles with split keys (Proposal 47382); until Nov. 19, 19 lighted buoys (Proposal 47348).

Metal Package Corpn., 110 East Forty-second Street, New York, manufacturer of metal boxes, cans and other containers, is considering extensions and improvements in plant at Long Island City. Cost over $40,000 with equipment. Company also plans expansion and betterments at branch plants at Baltimore and Hamilton, Ohio, each to cost close to amount noted.

Forman Machine & Electric Corpn., New York, has been organized by Irving and Max Forman, 330 West Thirty-eighth Street, and associates, to manufacture mechanical and electrical equipment.

Department of Sanitation, Municipal Building, New York, has secured approval from Board of Estimate for three new refuse incinerator plants, one at Thirty-first Road and 130th Street, Queens, to cost about $732,000 with equipment, power installation approximating $90,000 of sum noted. Another plant will be built on West Fifty-sixth Street, Manhattan, to cost about $1,000,000 with equipment; and third unit at 150th Street and River Avenue, Bronx, to cost about $800,000. Financing has been arranged through Federal aid.

APW Paper Co., Albany, N. Y., plans new multi-story paper converting plant on site adjoining local Liberty mill. Present converting plant at North Albany will be removed to new location and increased capacity arranged. Cost about $400,000 with machinery. Roger W. Bell is general manager.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 13 for 225 electric storage batteries (Schedule 3683) for Brooklyn Navy Yard; until Nov. 16, seamless steel tubing (Schedule 3701) for Brooklyn and Philadelphia yards; until Nov. 20, corrosion-resisting steel blading for impulse turbine units, and brass packing sections and accessories (Schedule 3695) for Brooklyn and Charleston, S. C., yards; electric storage batteries and spare parts (Schedule 3657) for Brooklyn, Portsmouth, Philadelphia, Norfolk and other yards.

Department of Water Supply, Gas and Electricity, Municipal Building, New York, plans new high-pressure pumping plant at Coney Island, for fire service. Cost about $452,000 with machinery. Financing has been arranged through Federal aid.

Orange County Brewing Co., 133 Lake Street, Middletown, N. Y., plans rebuilding part of plant recently destroyed by fire. Loss over $40,000 with equipment.

Luscombe Aircraft Corpn., Municipal Airport, Kansas City, Mo., Donald A. Luscombe, head, manufacturer of fabricated metal transport and military airplanes and parts, has leased one-story hangar, 80 x 100 ft., at Mercer Airport, Trenton, N. J., for new plant. Hangar will be remodeled for shop for parts production and assembling. Present works will be removed to new location. Proposed to have new plant ready for service in 60 days.

Z-Flex Piston Ring Corpn., Jersey City, N. J., has been organized by William R. Meagher and James E. Bennett, Jr., Jersey City, care of United States Corporation Co., 15 Exchange Place, capital $750,000, to manufacture piston rings and kindred engineering specialties.

Borough Board of Education, Chatham, N. J., plans manual training department in new multi-story high school. Fund of $386,000 has been arranged through Federal aid.

Supply Officer, Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until Nov. 13 for seven sets calibrating equipment, six sets tachometer testers, eight sets altimeter testers, eight sets thermometer testers, eight sets turn indicator testers, and 10 sets airspeed indicator testers (Aero Req. 663).

Board of Education, Claymont, Del., plans installation of tools and equipment for general metal-working course of instruction in local school.

NEW ENGLAND

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 16 for one motor-driven automatic screw machine (Schedule 3672) for Newport, R. I., Navy Yard; until Nov. 20, six electric furnaces (Schedule 3705) for Newport and Newport News, Va., yards.

U-Roll Corpn., Fitchburg, Mass., has been organized by Laurence G. Hobbs and Knute J. Cederholm, Fitchburg, to manufacture machinery and parts.

United States Property and Disbursing Officer, State House, Augusta, Me., plans one-story equipment storage and distributing building. Cost over $35,000 with equipment. Bunker & Savage, 256 Water Street, are architects.

Staples Coal Co., Fall River, Mass., plans rebuilding storage and distributing plant on Globe Wharf, recently destroyed by fire. Loss over $50,000 with mechanical-handling and other equipment.

Commanding Officer, Springfield Armory, Springfield, Mass., asks bids until Nov. 12 for 2000 pieces seamless steel tubing, each 16⅞ in. long (Circular 31).

Board of Selectmen, Somerville, Mass., plans manual training department in new multi-story school at East Somerville. Fund of $425,000 has been secured through Federal aid for building and equipment.

WESTERN PENNA.

Mine Safety Appliance Co., 201 North Braddock Avenue, Pittsburgh, manufacturer of safety appliances and devices, has let general contract to J. M. Baldwin, 1000 Macon Avenue, Northside, for one-story plant addition. Cost over $30,000 with equipment. Bernard H. Prack, Martin Building, is architect.

Buckeye Coal Co., Youngstown, Ohio, plans improvements in coal tipple on Monongahela River, Nemacolin, Pa., including new chute extension and mechanical-handling facilities.

Board of County Commissioners, City-County Building, Pittsburgh, plans central power house and shop buildings at new juvenile court detention home. Cost about $350,000. Financing has been arranged.

Lackawanna Beer & Ale Corpn., Washington, Pa., plans extensions and improvements, including new plant units and installation of equipment. Cost about $30,000.

BUFFALO DISTRICT

O-Neh-Da Vineyard & Distillery, Inc., Conesus, N. Y., Joseph Pritsch, Jr., secretary, is disposing of a stock issue to total $390,000, considerable part of fund to be used for extensions and improvements in distillery and winery, including new equipment.

Sylvanite Gold Mines, Ltd., Erie County Bank Building, Buffalo, is organizing company to take over and develop La Roche Gold Mines, Porcupine district, Canada. New machinery for mining, milling and other operations will be installed. Cost over $100,000.

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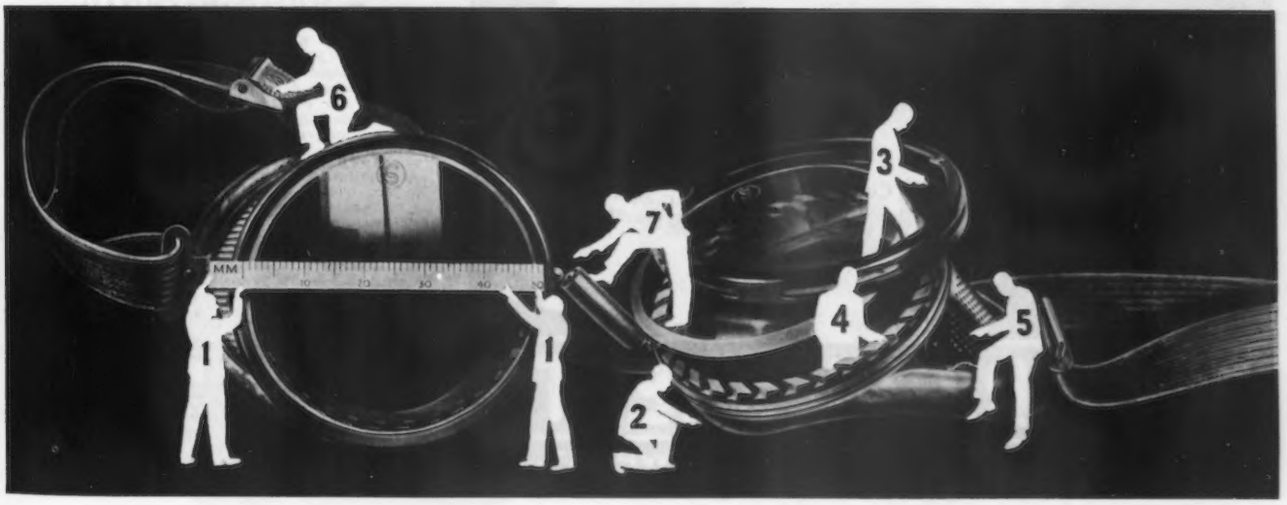

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ELECTRICAL SHEETS
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H. J. Peo Corpn., Rochester, N. Y., has been organized by Howard J. Peo, 38 Avenue D, and associates, to manufacture automatic vending machines and parts.

National Refining Co., Sarnia, Ont., plans extensions and improvements in oil refinery, including new gasoline refining and other machinery, tanks and auxiliary equipment. Cost over $250,000 with machinery.

OHIO AND INDIANA

E. I. duPont deNemours & Co., Inc., Wilmington, Del., has let general contract to A. Bentley & Sons Co., 201 Belmont Street, for extensions and improvements in former plant of Mountain Varnish & Color Works, Upton Avenue and Tremainsville Road, Toledo, Ohio, recently acquired at a receiver's sale. New units will be built and present buildings remodeled for manufacture of special enamels, paints, varnishes, etc. Cost about $250,000 with equipment. M. A. Dibble is company resident engineer in charge.

Production Plating Works, Inc., Lebanon, Ohio, W. L. Enghauser, president, has plans for one-story addition, 36 x 60 ft.

Germantown Distillery Co., Germantown, Ohio, recently organized, care of Walker & Norwick, American Building, Dayton, Ohio, architects, has plans for new works on site of former Mud Lick distillery, Germantown, with power house, machine shop and other mechanical departments. Cost over $100,000 with equipment. H. W. Bond, Dayton, is one of heads of new company.

Village Council, Clyde, Ohio, plans extensions and improvements in municipal electric light and power plant, including new equipment. Bond issue of $60,000 is being arranged.

Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Nov. 12 for axles, tail wheel axle spacers, wheel bearing spacer washer, engine throttle lever stops, tail axles and 100 fairing assemblies, 31-in. landing gear wheel (Circular 265); until Nov. 19, shelving and equipment (Circular 268); until Nov. 21, 4300 tow target assemblies (Circular 254), 521 CO_2 cylinders (Circular 226); until Nov. 22, 2000 parachute harness assemblies, 3000 parachute pack assemblies (Circular 256); until Nov. 23, cockpit lamp assemblies, running lamp lens gasket, running lamp assemblies, landing lamp reflectors, running lamp gaskets, landing lamp socket assemblies, landing lamp socket shield springs, landing lamp assemblies, landing lamp socket sleeve covers, landing lamp socket sleeves, landing lamp socket sleeve springs, running lamp reflectors, cabin lamp assemblies, instrument lamp assemblies, etc. (Circular 261).

Owens-Illinois Glass Co., 965 Wall Street, Toledo, Ohio, has let general contract to Glenn W. North Co., Ninth Street, Terre Haute, Ind., for one-story addition to Terre Haute plant, 160 x 400 ft. Cost over $80,000 with equipment.

SOUTH CENTRAL

Tennessee Valley Authority, Knoxville, Tenn., plans steel tower high-tension transmission line over Tennessee River at Hazel Ridge Shoals, in connection with new 22,000-volt transmission line from Athens to Dayton, Tenn.

Glenmore Distilling Co., Owensboro, Ky., will make plant extensions and improvements, with repairs and replacements in machinery. Plant will be temporarily closed to carry out program.

Director of Purchases, Tennessee Valley Authority, New Sprankle Building, Knoxville, Tenn., asks bids until Dec. 3 for two 56,000-kva. vertical shaft waterwheel generator units for Norris Dam power plant, including auxiliary equipment, and for one similar generating unit, 36,000 kva. for Wheeler dam power plant.

Cummins Distillery Corpn., Louisville, has let general contract for new plant units at Athertonville, Ky., where several old structures recently have been razed. Equipment purchases will include tanks, fermenting machinery, conveyors, loaders, etc. Entire cost about $200,000. Walter C. Wagner, Breslin Building, Louisville, is architect and engineer.

SOUTH ATLANTIC

Tampa Shipbuilding & Engineering Co., Tampa, Fla., Ernest Kreher, president, will soon begin construction of new four-section, 10,000-ton floating drydock, including shop units for construction and repair. Cost over $400,000 with equipment, with hoists, cranes, conveyors, etc.

Town Council, Mount Vernon, Ga., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for new municipal waterworks. Fund of $26,000 has been arranged. Knox T. Thomas, Standard Building, Atlanta, Ga., is consulting engineer.

Joseph R. Morton & Co., Inc., Graham, N. C., recently organized, has let general contract to C. M. Guest & Sons, Anderson, N. C., for two-story and basement electric-operated silk mill, 60 x 225 ft. Cost over $125,000 with machinery. Joseph R. Morton, Greensboro, N. C., is head.

City Council, Jacksonville, Fla., is considering report of Taylor Engineering Co., Jacksonville, consulting engineer, for extensions and improvemets in municipal electric light and power plant and system. Cost about $430,000 with equipment.

WASHINGTON DISTRICT

Bureau of Supply, Treasury Department, Washington, asks bids until Nov. 12 for miscellaneous hardware products as required for period, Jan. 1-March 31, 1935, including turnbuckles, barb wire, steel wool, ball bearings, barrel bolts, hinges, hinge hasps, blank keys, escutcheon pins, track spikes, sash weights, tacks, refuse cans, safety cans, wire cloth, door hangers, wire fencing, packing case strapping, etc.

Crown Cork & Seal Co., Eastern Avenue and Kresson Street, Baltimore, has asked bids on general contract for three additions, four-stories, 48 x 126 ft., one-story, 80 x 300 ft., and one-story, 31 x 32 ft. Cost over $75,000 with equipment. Lucius R. White, Jr., 10 West Chase Street, is architect.

Commanding Officer, Submarine Mine Depot, Fort Monroe, Va., asks bids until Nov. 22 for 38,400 ft. galvanized wire rope (Circular 3).

Chief of Ordnance, United States Army, Washington, asks bids until Nov. 19 for three

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12-in. high-speed crank shapers, eight vertical shapers, two keyseating machines, three 24-in. hydraulic shapers, three high-speed planers, one heavy-duty planer (Circular 4), two transformers, 30 electric motors, three individual motor-drive attachments, one motor-generator unit, 23 electrical equipments (Circular 8); until Nov. 20, 30 7-in. tool-room lathes, seven 8½-in. bench lathes, and three 9-in. motor-driven precision bench lathes (Circular 10); four thread milling machines, three universal thread bobbing machines, seven pipe-threading and cutting machines (Circular 11), one heat-treating furnace for H. E. shells, gas-fired, two nose-heating furnaces for H. E. shells, one electric furnace for iron and iron alloys, one electric furnace for brass and bronze alloys, one continuous hardening and tempering furnace, one air draw furnace, five pot-type electric furnaces, two electric tempering furnaces, one gas-mixing machine, eight automatic temperature controls, and two pit-type electric furnaces (Circular 17).

MIDDLE WEST

United States Engineer Office, Rock Island, Ill., asks bids until Nov. 27 for traveling tainter gate hoist for Dam No. 20, Mississippi River, near Canton, Mo.

Chromium Corpn. of America, Inc., 4645 West Chicago Avenue, Chicago, has let general contract to Robert G. Regan Co., 228 North La Salle Street, for one-story addition, 75 x 125 ft., for electro-plating works. Olsen & Urbain, 228 North La Salle Street, are architects.

Swift & Co., Union Stock Yards, Chicago, have let general contract to J. H. Huntzinger & Co., Davenport, Iowa, for one-story addition to branch packing plant at Grinnell, Iowa. 75 x 100 ft. Cost about $35,000 with equipment.

Apex Railway Devices, Inc., 21 West Elm Street, Chicago, has been organized by Edward T. Doherty, and associates, to manufacture railway equipment and devices.

Public Utility Board, City Hall, Rochester, Minn., plans early call for bids for addition to municipal electric light and power plant. Cost about $100,000 with equipment. Schuett-Meier Co., 490 North Snelling Avenue, St. Paul, Minn., is engineer.

Frank Mattern Mfg. Co., 4140 North Kolmar Avenue, Chicago, manufacturer of X-ray equipment and parts, has let general contract to Borg & Johanson, 2458 Irving Park Boulevard, for one-story addition, 50 x 60 ft. Arvid F. Tessing, 75 East Wacker Drive, is architect.

Creede Custom Mill & Mines, Inc., Creede, Colo., recently organized, plans new ore-treatment mill for gold and other precious metals, including cyanide, flotation and concentrating divisions. Machinery will be electric-operated, with power furnished by Public Service Co. of Colorado, Denver. Cost close to $100,000 with equipment.

Rath Packing Co., Elm and Lafayette Streets, Waterloo, Iowa, meat packer, has let general contract to H. A. Maine Co., Marsh Place Building, for one and five-story addition, 45 x 100 ft. Cost over $60,000 with equipment. H. Peter Henschien, 59 East Van Buren Street, Chicago, is architect and engineer. Company has plans for multi-story addition to power house by Stone & Webster Engineering Corpn., Boston, consulting engineer, to cost about $175,000 with equipment.

MICHIGAN DISTRICT

Norge Corpn., Muskegon Heights, Mich., manufacturer of electric refrigerators and parts, has let general contract to Strom Construction Co., Grand Rapids, Mich., for one-story addition, 100 x 300 ft. Cost over $60,000 with equipment.

Pontiac Mfg. Co., Pontiac, Mich., recently organized by Hugh Chalmers, Jr., head of Pontiac Spring & Bumper Co., Pontiac, and associates, will operate new plant on Scott Lake Road for manufacture of automobile parts and equipment, including replacement parts for different standard cars, and general gray iron castings. Plant will include machine shop and foundry units.

Alarm Mechanism Corpn., Flint, Mich., has been organized by Iser Nickola, 1923 Avenue A, and associates, capital $100,000, to manufacture alarm and signal equipment and devices and operating mechanisms.

City Council, Menominee, Mich., has plans by Francis Engineering Co., Saginaw, Mich., consulting engineer, for new municipal electric light and power plant, and will soon ask bids. Fund of $803,000 has been secured through Federal aid.

Robbennolt-Otto Corpn., Saginaw, Mich., has been organized by Floyd E. Robbennolt, 249 Goff Building, and associates, to manufacture mechanical equipment and devices.

SOUTHWEST

United States Engineer Office, Postal Telegraph Building, Kansas City, Mo., asks bids until Nov. 12 for four motor-driven air compressors (Circular 156).

Baden Furnace & Sheet Metal Co., 917 Baden Street, St. Louis, has been organized by M. G. Nevins and Karl Schmidt, Diamond Drive and Gibson Road, and associates, to manufacture sheet metal products, furnace equipment, etc.

Board of Education, Library Building, Kansas City, Mo., will take bids at once on general contract for new three-story and basement Lincoln high school, to include manual training department. Cost about $700,000. Charles A. Smith, Finance Building, is architect; Nate W. Downes, last noted address, is mechanical engineer.

City Council, La Plata, Mo., will take bids soon for new municipal electric light and power plant and distribution system. Fund of $100,000 has been arranged through Federal aid. E. T. Archer & Co., New England Building, Kansas City, Mo., are consulting engineers.

Rado Refining & Producing Co., McAllen, Tex., plans extensions and improvements in oil and gasoline refinery. New cracking equipment and other machinery will be installed. Cost about $60,000 with equipment.

Town Council, Santa Rosa, Tex., plans early purchase of motor-driven pumping machinery and accessories, 50,000-gal. steel tank on 100-ft. tower, gasoline engine units for standby service, pipe lines, etc., for new municipal water system. Fund of $26,000 has been arranged through Federal aid. H. E. Bennett, 1025 South Ohio Avenue, Mercedes, Tex., is consulting engineer.

PACIFIC COAST

Steuben Brewing Corpn., 682 South Vermont Avenue, Los Angeles, has acquired 10-acre tract at Arcadia, Cal., for new plant, with power house. Cost over $100,000 with equipment. George W. Harding is company engineer.

Board of Education, South Pasadena, Cal., plans extensions and improvements in shop building at high school. Cost about $25,000. Marsh, Smith & Powell, 816 West Fifth Street, Los Angeles, are architects.

Great Dike Gold Mines, Inc., San Francisco, care of H. DeC. Richards, Crocker Building, president and consulting engineer, plans operation of gold-mining properties in El Dorado County, with installation of mining machinery, conveying, elevating, loading and other equipment. Company is arranging for sale of stock to total $162,500, part of fund to be used for purpose noted.

Magnus Co., 3074 St. Helens Road, N. W., Portland, has let general contract to A. J. Bingham, 201 Worcester Building, for new one-story foundry.

Island Pipe & Supply Co., South Front and Walnut Streets, Yakima, Wash., has let general contract to Leo Ross, Yakima, for one-story addition, 40 x 50 ft., for storage and distribution, pipe-fitting, cutting, etc.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 16 for gasoline filters, filter elements, gasoline hose nozzle valves, etc. (Schedule 3694); until Nov. 23, spare parts for airplanes (Schedule 900-7659) for San Diego Navy Yard.

Federated Metals Corpn., 75 Folsom Street, San Francisco, has awarded general contract to Barrett & Hilp, 918 Harrison Street, for three-story addition. Cost about $23,000 with equipment. Ellison & Russell, Pacific Building, are consulting engineers.

FOREIGN

La Cellophane, S. A., Paris, France, manufacturer of transparent paper stocks, etc., plans multi-unit plant near Manchester, England, including power house, machine shop and other mechanical departments. Cost over $500,000 with machinery. Company is closely associated with Courtaulds, Ltd., Manchester, manufacturer of cellulose rayon products.

Japan Manchukwa Aluminum Co., Toyama, Japan, plans new works for manufacture of aluminum products, with power house. Cost over $400,000 with equipment.

Libby, McNeill & Libby, Union Stock Yards, Chicago, manufacturers of food products, are considering construction of plant at Milnthorpe, near Carnforth, Lancashire, England, for production of condensed milk and kindred food specialties. Cost over $300,000 with equipment.

Ministry of National Economy, Berlin, Germany, has authorized organization of group of lignite mine operators, and will design and supervise erection of plant for production of synthetic gasoline, in lignite mining district in central Germany. Cost close to $10,000,000 with machinery.